EPA/ROD/R05-96/307
1996

EPA Superfund
Record of Decision:

PARSONS CASKET HARDWARE CO.
EPA ID: ILD005252432
OU 01
BELVIDERE, IL
09/30/1996

<IMG SRC 0596307>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

<IMG SRC 0596307A>

REPLY TO THE ATTENTION OF:

Mary Gade, Director
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62794-9276

Re: Parson's Casket Site - Belvidere, Illinois Concurrence on Record of Decision

Dear Ms. Gade:

The United States Environmental Protection Agency (U.S. EPA) hereby concurs with the decision that institutional controls and deed/zoning restrictions for the shallow soils and excavation and removal for the deep soils are necessary as identified in the enclosed Record of Decision (ROD) completed by the Illinois Environmental Protection Agency (IEPA) for the Parson's Casket Hardware Site. Our concurrence is in accordance with 40 CFR §300.525(e)(2)(i) and (ii) and is based on the administrative record.

U.S. EPA understands that the soils operable unit addresses the source of the contamination and is not the final remedy at the Site. A subsequent operable unit addressing the groundwater contamination is expected to follow.

We look forward to our continuing involvement on the Parson's Casket Hardware Site.

Sincerely yours,

William E. Muno, Director
Superfund Division

Enclosure

<IMG SRC 0596307B>

DECLARATION OF THE RECORD OF DECISION

SITE NAME AND LOCATION

Parson's Casket Hardware
Belvidere, Illinois

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Parson's Casket Hardware Site in Belvidere, Illinois, which was chosen in accordance with CERCLA, as amended by SARA and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site. The USEPA Region V concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The remedial action addresses two (2) operable units--shallow and deep soils. Groundwater is a separate operable unit and is still under investigation. The groundwater operable unit will be addressed under a separate ROD. The shallow soil operable unit is being defined as the area from ground surface to 1 foot below land surface (BLS). The deep soil operable is the area greater than 1 foot BLS to groundwater (approximately 20 feet BLS). The shallow soil operable unit remedy selection consists of institutional controls and deed/zoning restrictions for the property to reduce the risks associated with exposure to contaminated materials. Restrictions would apply so that the property remains industrial since it was shown that the population at greastest risk would be future adult or child residents. The function of the deep soil operable unit remedy selection is to excavate and remove from the site a source of VOCs, SVOCs, and metals from an abandoned lagoon area which was utilized to dispose electroplating wastes from the 1930s to 1982 and to determine the nature and extent of contamination and remediate dry wells presumed to be on the property. Both the lagoon and the dry wells are continuing to degrade the local groundwater, which is utilized as a drinking water supply for the City of Belvidere.

The major components of the selected remedy include:

- Installation of a security fence around the site;
- Deed/zoning restrictions to prohibit groundwater use, limit building construction on the site (i.e., residential construction), and control waste material generated from manipulation of soils at the site (e.g., footings for buildings);
- Excavate and remove contaminated soils from the abandoned lagoon area and determine remedial action for the suspected dry wells;
- Groundwater monitoring;

DECLARATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in potentially hazardous substances to remain on site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

<IMG SRC 0596307C>

Mary A. Grade, Director — Date
Illinois Environmental Protection Agency

SUMMARY FOR THE RECORD OF DECISION

Site Name, Location, and Description

The Parson's Casket Hardware Site, located in Belvidere, Illinois is a National Priorities List (NPL) site under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund. The Illinois Environmental Protection Agency (IEPA), under a Cooperative Agreement with the U.S. Environmental Protection Agency (USEPA), conducted a Remedial Investigation/Feasibility Study (RI/FS) on this Superfund site.

The Parsons Site is located on the northwest side of Belvidere, Illinois covering about 6 acres and is bordered by residential communities to the east and various industrial facilities to the west, north and south. The Kishwaukee River is 1/4 mile south of the site. Two of Belvidere's eight municipal water supply wells are located approximately 1,500 feet northwest and 1/2 mile southwest of the site, respectively. Both wells are used on a daily basis. The municipal well located northwest of the site has had hits of TCE, which were also found at the site, however, the levels were not above MCL's. The United States Geological Survey (USGS) has performed some work at the site on the deep aquifer. However, no definite conclusions were made that the contaminants were from Parson's. Most likely the contamination is from multiple sources, including Parson's. Groundwater has extended to the Kishwaukee River and it is believed to be discharging into the river basin.

The Parson's Casket Hardware Company manufactured decorative metal fittings for caskets at the site from the early 1920's to 1982. Such operations require the use of hazardous chemicals, and hazardous waste byproducts are created as a result of the manufacturing process. The Parson's Company continued to operate in the same facility until filing for bankruptcy in August 1982. Waste generated mainly consisted of electroplating sludge, cyanide plating solution, cyanide cleaning solutions, bronze, nickel and brass sludges, and cleaning solvents.

A series of aerial photos taken from 1954 to 1986 at various intervals show activities that occurred at the site and features which no longer exist. A lagoon was one of the principle waste disposal locations. A railroad spur is visible in a few of the aerial photos. Reportedly, liquid wastes were disposed of along the track prior to construction of the lagoon (IEPA 1989).

The west wing of the existing facility was used for diecasting and remelting of metals. The most commonly used metals were lead brass, diecast steel, white metal, silver, and zinc. Reportedly, the company used low volumes of diluted cyanide solutions in the west wing operations and large quantities of alkaline compounds and sulfur.

The east wing of the facility housed the finishing operations. Cyanide treatment and electroplating was conducted on the first floor. Trichloroethylene (TCE) treatment and refurbishing of meals were performed on the second floor. Reportedly, there were approximately ten dry wells used for disposal of cyanide waste sludge on the north side of this wing. See Figure 1-2 for summary of site conditions.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Parson's Company obtained interim status to operate a hazardous waste management facility under the Resource Conservation and Recovery Act (RCRA) in 1980. The company notified USEPA that hazardous waste was stored on-site in tanks and containers. The listed waste streams on the RCRA part A application were F006 (wastewater electroplating treatment sludges for electroplating operations and F009 (cleaning bath solutions from electroplating operations where cyanides are used).

In 1982, the Illinois Attorney General's Office (which subsequently informed IEPA) received an anonymous tip that the Parson's Company was going to cease operations and abandon hazardous wastes at the site. A subsequent IEPA investigation found that Parson's Company stored cyanide plating wastes in drums, treatment tanks, underground storage tanks, and in an unlined lagoon. The lagoon was used to contain overflows from the company's treatment system. Plating wastes include spent strippers, electroplating sludges, degreasers, acids, heavy metals (those most commonly used were lead, brass, diecast steel, white metal, silver, and zinc), and cyanides. During the investigation, IEPA also observed approximately 300 metal drums outside of the treatment building. Most of the drums were full, other were partially filled without lids, and some were empty. Some of the drums showed signs of deterioration and leakage.

At IEPA's recommendation, Parson's began a voluntary cleanup of the site. The cleanup was started but on August 12, 1982, Parson's Company informed IEPA that the company had declared bankruptcy and was not able to complete the cleanup.

Legal action by the State of Illinois followed, and an agreement with Dickey-Grabler was negotiated in 1982 to secure the Parson's Site. The Parson's Company removed most of the waste from the underground storage tanks and installed a chain link fence around the lagoon. Materials in the rusting drums were removed and placed in new sealed drums, all drummed waste material was placed in the secured building, and signs were posted. In 1984, the on-site buildings were purchased by Filter Systems, Inc. of Addison, Illinois. The company agreed to recycle and remove the drums, tanks, and other containers stored in the building.

In February 1986, IEPA inspected the building following the Filter Systems cleanup. Immediate concerns were adequately dealt with since all plating solutions and wastes were safely contained. Subsequently all remaining wastes under the RCRA Part A permit were disposed by a qualified contractor. Currently, Deveco Corporation, a company that blends chemicals for the plating industry, operates in the building. Chemicals are safely stored in drums inside the building or in above ground tanks outside the building.

1.0 PREVIOUS INVESTIGATIONS

As part of the August 1982 IEPA investigation, testing was conducted on the plating solutions found in the drums and tanks and lagoon sediments. Results showed they contained elevated concentrations of heavy metals. Two private wells, located approximately 1/2 mile from the site were also sampled for inorganic chemicals. No concentrations were detected above state standards.

IEPA conducted a partial cleanup of areas outside the site building from fall 1984 through spring 1985. Waste materials including lagoon liquids and sludge were removed and treated and disposed of off-site. A one-foot thick sludge seam was uncovered at the bottom of the lagoon. Three underground storage tanks were removed while a fourth was left in place and filled with sand.

From 1984 through 1989, IEPA and USEPA sampled and analyzed surface soil, subsurface soil, and groundwater samples. Soil borings were drilled and three on-site monitoring wells were installed. Routine sampling of some wells was conducted for approximately two years from 1985 to 1987. Surface soil samples, obtained from areas west of the lagoon to determine effects of lagoon runoff, indicated concentrations of nickel and copper slightly above normal background levels. Groundwater samples indicated that dissolved metals were above state standards. Also, volatile organic compounds (VOCs) were detected in groundwater samples. Observed concentrations of these compounds were above respective state and federal standards. Due to these results and the naming of the site to the National Priorities List (NPL), IEPA and USEPA entered into a cooperative agreement for the Parson's Casket site. Pursuant to this agreement, IEPA is performing an RI/FS to determine the full nature and extent of contamination at the site.

2.0 REMEDIAL INVESTIGATION

Field investigations at the Parsons' Site involved a two-phase approach. The Phase I field program was conducted from May to September 1989. During this phase, 23 soil borings were drilled and sampled, 13 monitoring wells were installed and two rounds of sampling were completed, a topographic map was created and aquifer tests were performed. Phase II, 11 soil borings were drilled and sampled, groundwater plume chasing program was conducted, 15 monitoring wells and one extraction well (a well designed to receiver hydrocarbons floating on top of groundwater) were installed, and packer sampling and aquifer testing was performed in the three deep bedrock boreholed by USGS. Phase II work also included collecting of geophysical logs in the three deep bedrock boreholes, aerial and land surveying to update the site map, and two rounds of sampling and analysis of all Phase I and II monitoring wells.

2.1 SOIL SAMPLING

A soil investigation was performed to locate and determine the nature and extent of contaminants in surface and subsurface soils at the Parson's Site. Locations and concentrations of contaminants were determined from samples collected from both soil borings and monitoring wells boreholes. Samples of background soil were also collected for comparison to soil samples collected on-site. In addition, the soil investigation yielded geologic descriptions of soils and grain-size analysis of selected soil samples.

Phase I soil sampling locations were chosen based on information from IEPA's file containing site inspection reports, memos, aerial photos and other site-related information, former Parson's Company employees, and regional geologic reports. Phase II soil sampling locations were selected to provide additional data on contaminants that may be migrating offsite. Samples were analyzed for VOCs, SVOCs, metals, and cyanide. See Figure 2-1 for the soil sampling grid and locations.

2.2 GROUNDWATER SAMPLING

Four rounds of groundwater sampling were conducted during Phases I and II of the RI. Phase I monitoring well locations were based on review of regional geological information, site-specific geologic information previously collected by IEPA, and the sources previously mentioned for soil boring locations. Phase II well locations were based on the plume chasing effort and to eliminate data gaps from the Phase I investigation. See Figure 2-2. for the groundwater monitoring well locations.

Groundwater sampling rounds 1 and 2 were conducted during Phase I, and consisted of sampling and analysis of 13 monitoring wells. During Phase II, groundwater sampling rounds 3 and 4 consisted of sampling and analysis of the 13 Phase I wells and the 16 newly installed Phase II wells. In addition, three wells were sampled at the Taptite Production Facility of Camcar/Textron, Inc., a manufacturing operations adjacent to the Parson's Company. Data collected from all rounds of sampling were intended to determine the vertical and lateral extent of contamination. In addition, the groundwater quality hydraulically upgradient of the site was investigated. Water levels were used to determine approximate groundwater flow directions and velocities. Groundwater samples were analyzed for the following parameters:

- VOC (Volatile Organic Compounds)
- SVOC (Semi-Volatile Organic Compounds)
- Dissolved Metals, total metals (on selected samples)
- Dissolved Cyanide
- Anions
- Cyanide amenable to chlorination
- Alkalinity
- Specific Conductivity, pH and temperature.

See Figures 3-1 through 3-7 for location of cross section lines referencing the geology of the site.

2.3 PLUME CHASING

During the Phase II field effort, a plume chasing investigation was performed in an attempt to map the down-gradient lateral extent of contamination migration in the alluvial aquifer. Groundwater was sampled at selected locations through temporary well points and analyzed for target VOCs using quick-turnaround (48-hour) lab analysis. Analytical results were then used to place monitoring wells. Specifically, results were used to decide whether to install a monitoring well(s) at that location or move further downgradient and attempt another well point. Wells were originally planned for areas where no VOCs were detected. If VOCs of concern were detected, then a second location was to be drilled further downgradient.

2.4 LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL)

During Phase II a product extraction well was installed to collect an LNAPL and groundwater directly below it. Samples were collected to determine the composition of the material and test for hazardous compounds such as PCBs that are often present in waste oils. The LNAPL was sampled for SVOCs and Pesticide/PCBs and groundwater was analyzed for VOCs, SVOCs, Pesticides/PCBs, and 2,3,7,8 TCDD/TCDF (Dioxin).

2.5 RESIDENTIAL WELL SAMPLING

The purpose of the private well evaluation was to identify whether private wells were being impacted near the Parson's Site. Ten private wells were samples which are approximately 0.5 mile to 1.5 miles from the site. Samples were collected directly from taps that were in-line with the residence well. No samples exceeded Class I, Illinois Groundwater Regulations. Homes adjacent to the site are serviced by the City of Belvidere's public water supply system.

3.0 OTHER SITE SAMPLING AND FIELD ACTIVITIES

During the Phase II field efforts, samples of the metallic material in the smelter building of the Parson's Company and of the clinker material and burned material on the surface of the site were collected.

Metallic material was present inside and outside of the old smelter room at the west corner of the existing building. Specifically, loose material was present on the ground and on the discharged equipment in the room, and melted onto the walls of the building. Samples were collected for analysis.

Clinker material, the residue from coal burning, is commonly used as the foundation of railroad beds. This material was found throughout the Parson's Site in the top 1 to 3 feet of soils. Also, charred wood chips, probably from burned railroad ties, are also present. During Phase I, polynuclear aromatic hydrocarbons (PAHs) and creosote products were detected in surface samples. PAHs and creosote were suspected to result from the clinker material and burned wood chips. Samples were collected and analysis conducted or SVOCs, total metals, and cyanide. Aquifer testing of Phase I monitoring wells was conducted by USEPA. The hydraulic conductivities of the aquifer(s) beneath the site were determined from rising and falling head slug tests. A rising head test is conducted by removing a "slug" of water from a well and recording the change in water level with time as the well recovers to the static condition. A falling head test is the opposite, i.e., a sludge of water is added.

Packer sampling tests were conducted by the U.S. Geological Survey in three 150-foot bedrock boreholes and one 300-foot bedrock borehole. The purpose of the packer sampling was to determine the vertical distributions of VOCs, and the hydraulic properties of the bedrock under the Parson's Site.

USEPA is the lead enforcement Agency conducting the Potentially Responsible Parties (PRPs) search and any subsequent enforcement actions.

COMMUNITY RELATION ACTIVITIES

An Administrative Record (AR) is available to the public at the IDA Public Library located in Belvidere, Illinois, as required by CERCLA Sections 113(k)(2)(B)(i-v) and 117. The IEPA produced a Community Relations Plan (CRP) in 1988 and an addendum to the plan was developed in July 1991. The mailing list was updated prior to the release of the Proposed Plan/Public Hearing notice. A Public Hearing was held on August 7, 1996 at the IDA Public Library regarding the Feasibility Study (FS) and the Proposed Plan.

SCOPE AND ROLE OF OPERABLE UNITS

1. The remedial action consists of three operable units 1) Groundwater 2) Shallow Soil and 3) Deep Soil.

1. Groundwater Operable Unit:

The groundwater remedy selection will be concluded under a separate FS.

2. Shallow Soil Operable Unit:

For remediation purposes, this unit is being considered 1 foot or less below land surface (BLS). This unit's remedy incorporates a "limited" no action, consisting of deed notices and restriction of activities to manage contact with soils of concern. The risk associated with this site allows for an industrial scenario to continue with minimal remedial activities (e.g., removal [and disposal] of shallow soils during the deep soil remedial action).

3. Deep Soil Operable Unit:

For remediation purposes, this unit is being considered greater than 1 foot BLS to groundwater (approximately 20 feet BLS). This unit's remedy involves excavation of only a portion of the deep soils at the site. The excavated waste will be disposed of at an off-site disposal unit permitted to accept the waste. The excavated area would then be filled with clean soil. This remedy greatly reduces the toxicity, mobility and volume of contaminants that were discovered at the site.

SUMMARY OF SITE CHARACTERISTICS

3.0 NATURE AND EXTENT OF GROUNDWATER CONTAMINATION

VOCs have been detected in the groundwater in alluvial and fractured dolomite (bedrock) aquifers below the Parson's Site. The main VOCs detected in the study area are tetrachloroethylene (PCE), trichloroethylene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA). Degradation products such as 1,2-dichloroethylene (1,2-DCE), 1,1-dichloroethylene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), and vinyl chloride also have been detected in association with the parent compounds.

The pattern of VOC contamination indicates a possibility that two plumes exist within the parson's Site Remedial Investigation study area. Two contour plots are presented in Figures 4-7 and 4-8 to show contaminant migration patterns. PCE is only detected in the western and south to southwestern portions of the deep alluvial aquifer, and does appear to be migrating away from the site. TCE and

1,1,1-TCA, in contrast, appear to be migrating away from the site lagoon area. Ratioing of TCE to 1,1,1-TCA concentrations show that samples with the highest ratios are directly adjacent to the lagoon area or down-gradient. Since TCE and 1,1,1-TCA have approximately the same mobility, these results probably indicate that TCE was predominant compound used at the Parson's Site. Vinyl chloride was only detected in the southern most wells of the study area, and appears to be associated with the PCE plume.

The greatest concentration of TCE detected in the deep alluvial wells is associated with the previous location of the lagoon. Contamination is concentrated at the former location of the lagoon and decreases toward the southeast. However, elevated concentrations of TCE were also detected in the south and southwest portions of the study area.

Groundwater flow in the deep alluvial aquifer is primarily toward the southeast and is consistent with TCE migration away from the lagoon area in this direction. However, TCE is also present in the south and southwest study area deep alluvial wells, which is cross-gradient from contamination associated with the lagoon. Two explanations may account for contamination in the south and southwest: a separate historical source to the west or southwest, or changing groundwater flow.

PCE was only detected in deep alluvial wells in the south and southwestern portions of the study areas. The PCE to TCE ratio is higher for groundwater samples in the southwestern portion of the study area. This area is cross gradient from the Parson's Site, and since little PCE is associated with wells on-site, this increase in PCE concentrations is consistent with another source (or sources) of contamination.

VOC contamination has migrated into the bedrock aquifer. However, because of the heterogeneous flow which may develop in a fractured bedrock system interpretation of extent of contamination is difficult. Hydrogeologic investigations by USGS of the bedrock near the site (Mills 1992a, 1992b, 1992c) indicates that contamination has migrated into the Saint Peter sandstone, an aquifer which supplies water to municipal wells. Therefore, it is possible that this contamination may have spread toward Municipal Wells Nos. 4 and 6.

Anion results indicate an increase of chloride in several portions of the study area. In general, these results appear to be associated with contaminant plumes both from the lagoon area, and in the south to southwestern portions of the study area.

The LNAPL detected in the center of the site contains VOCs and SVOCs. Several of the VOCs are also associated with groundwater contamination detected directly below the LNAPL and in other wells through the study area. Although the LNAPL may be a source of contamination to the groundwater, it is not interpreted as the primary source mainly because of the limited area of influence. Other wells cross-gradient from the LNAPL show concentrations at the same order of magnitude as groundwater directly below the LNAPL. SVOCs were detected in groundwater below the LNAPL, but these compounds were not detected in any other wells, therefore, migration of these compounds is not considered extensive.

Results from inorganic chemical analysis indicate that some migration of analytes such as copper and nickel may be occurring, but only results from wells on-site show concentrations above Illinois Class I Groundwater Standards or Federal MCLs; therefore, migration of these analytes is localized.

Cyanide was detected in several wells on-site, primarily in the eastern portions. In general, these concentrations are low except for samples from one well (G112S) which are near State and Federal regulatory criteria. Analysis indicates that this cyanide is not amenable to chlorination, therefore the possibility for cyanide migrating to groundwater is significantly reduced. Potential cyanide migration to the east and southeast is not completely bounded by wells. Chemicals detected in the groundwater can be found in Table 1-4.

Groundwater is being investigated under a separate operable unit and will be concluded under a future FS. The information provided above is for comparison purposes and to provided additional information in support of the soil operable units remedy selection.

4.0 NATURE AND EXTENT OF SOIL CONTAMINATION

The results of the shallow soil (1 foot or less BLS) analyses indicate areas of surface organic and inorganic contamination currently exist; these appear to be due to spillage from the old railroad spur and plating tanks, vertical tanks located north of the site, or drums which were spilled or leaking chemicals. Chemicals detected in the soil above background levels are frequently associated with plating solutions (heavy metals and cyanide) or are used as cleaning solvents. This surface soil contamination by metals may pose ingestion or inhalation health threats. See Figure 1-1, Table 1-1 and Table 1-2 for summaries of shallow and background soil results.

In general, the results from the deep-soil boring investigation indicate that small isolated areas around the old lagoon area at greater than 1 foot to 20 feet BLS exists with low concentrations of VOC, SVOC, and inorganic chemicals. These areas may have been missed during excavation of the lagoon, including a sludge seam observed during the 1984-85 removal action. These remaining chemicals, may still be contributing to groundwater contamination. Chemicals detected in the deep soils are summarized in Table 1-3.

The predominately carbonate facies groundwater suggests that bicarbonates and carbonates should also be present. Under these groundwater conditions, the heavy meals copper, nickel, lead, and zinc are most likely present as +2 species or as oxides/hydroxides.

Current groundwater conditions indicate that the metals of concern should not be very mobile in groundwater. However, conditions during past on-site disposal activities may have been different, allowing at least initially, for the metals to migrate. Such conditions could have been caused by disposal of bulk quantities of acid waste, such as plating waste. The metals would have been soluble in the acids and migrated from the site until the dilution by the groundwater and reaction with the soil was sufficient to raise the pH to neutral conditions.

Cyanides may have been present as metallocyanides. However, they have probably dissociated to some extent in the groundwater and migrated relatively freely, although their sporadic presence may be an indication that biodegradation has removed much of these compounds.

The distribution of contaminants in groundwater beneath and in the vicinity of the site and nearby residential areas indicates that conditions that allow for the mobility of these contaminants existed in the past. Since the fluid in the lagoon was higher than the elevation of the surrounding groundwater, contaminants in the lagoon could have migrated into the groundwater. Additionally, contaminants in other areas of the site could also have migrated into the groundwater.

Semivolatile organic compounds (e.g., PAHs) are probably a result of railroad operations (burning or treting of ties; disposal of "clinker" material). These compounds are not mobile, and may be biodegradable.

5.0 CHEMICAL FATE AND TRANSPORT

Chemicals released into the environment interact with the natural surroundings. Their persistence in the environment is affected by soil chemistry, nature of soft gas, atmospheric interactions and groundwater chemistry. Interaction with other chemicals (both natural and anthropogenic), presence of bacteria, and availability of gaseous radicals and acids also affects the fate of released chemicals. Organic and inorganic contaminants that are present at the site are subject to several processes which control their movement and fate. Adsorption is the main process which retards (relative to average groundwater velocity) the movement of contaminants. Via adsorption, contaminants are absorbed onto organic matter and/or clay surfaces. Adsorption of metals to clay surfaces removes them from groundwater. Calculated retardation factors for the organic contaminants within the saturated zone range between 1.6 and 4.0, depending upon the organic content. Average shallow groundwater velocity is estimated to be between 0.005 to 3 ft./day thus yielding approximate organic-contaminant groundwater-transport rates ranging from a low of .001 ft./day to a high of 1.9 ft./day in the shallow aquifer. Rates within the deep aquifer are of the same order of magnitude. Rates within the vadose zone would be considerably lower due to allowed water content. Rates for vapor transport, however, are slightly higher. Calculated vapor-phase retardation factors range between 1.6 to 1.9.

Although adsorption tends to slow the migration of contaminants, persistence of "parent" contaminants is affected by abiotic and biotic transformations. The same general principles of sorption and transformations are valid in the unsaturated and saturated zones. Both are controlled by amount of water and thus, most likely to occur at soil -- and rock-water interfaces (i.e., perched zones; regions of high clay content) and within the saturated zone. The result of transformations is the breakdown of original parent contaminants to byproducts which may be subject to further breakdowns. The present of 1,1-DCE, 1,1-DCA, and vinyl chloride indicates that transformations of PCE, TCE, and 1,1,1-TCA may be occurring. See Figure 5-1.

The sorption, or precipitation, of metals is dependent on several factors which include availability of water and pH-Eh conditions of the local environment. Eh is the oxidation reduction potential which indicates whether groundwater is in an oxidizing or reducing state. In the presence of alkaline soils subject to the right conditions (e.g., pH greater than 8), certain metals will tend to precipitate. Slight changes in conditions, however, would result in the dissolution of any precipitated metals. Assuming a system with a pH of 6.5 to 7.5, the observed metals can exist as several different valences depending on the Eh value.

SUMMARY OF SITE RISKS

6.0 BASELINE RISK ASSESSMENT

Risk Assessment is an essential component of the RI/FS at Superfund hazardous waste sites. A baseline risk assessment was conducted as part of the RI for the Parson's Site to assess site conditions in the absence of remedial actions to, more specifically, evaluate potential risks to human health, and to support the determination of the need for site remediation. It examined the presence and release of chemicals from the site, the observed levels of chemical contaminants in the environment, the potential routes of exposure to human receptors, and the likelihood of adverse health effects following contact with contaminated environmental media. An ecological assessment was not conducted since the Parson's Site is very small and located in the heart of an industrial section of Belvidere. In addition, there are no known endangered species present or critical habitats within the site. In conducting this baseline risk assessment, the USEPA guidance document (USEPA 1989) was used as a primary source of information.

The baseline risk assessment involves performing four key steps: identification of potential chemicals of concern; an exposure assessment; a toxicity assessment; and a risk characterization. In addition, an 7uncertainty evaluation, a qualitative assessment of the effect of uncertainty on the risk evaluation, a qualitative assessment of the effect of uncertainty on the risk assessment of the Parson's Site is presented.

Uncertainty is inherent in the selection or derivation of key input parameters and in conducting analyses. Results of the baseline risk assessment must be viewed as estimates that span a range of possible values that may be understood only in light of the fundamental assumptions and methods used in the evaluation. Given that the verified toxicity measures used in baseline risk assessment are established by USEPA, the greatest sources of uncertainty are the determination of exposure point concentrations, the development of exposure scenarios, and the derivation of long-term intake or dose estimates for the human receptors at greatest risk.

6.1 IDENTIFICATION OF POTENTIAL CHEMICALS OF CONCERN

Results of the analysis of soil and groundwater the Parson's Site were evaluated for use in the baseline public health risk assessment. Chemicals in shallow soils were identified and incorporated into the baseline risk assessment by comparison with background shallow soils. The risk assessment characterized the risks of the site-related soil set and background soil separately.

The leaching of contaminants from deep soils (greater than 1 foot BLS) to groundwater, another source of potential contamination, was examined as part of the risk assessment. This is an important pathway because it addresses the potential for deep soils contributing to groundwater contamination. An equilibrium partioning approach was utilized to produce the maximum possible concentration of a contaminant in groundwater resulting from the leaching process occurring in deep soils.

6.2 EXPOSURE ASSESSMENT

The exposure assessment is intended to estimate the type and magnitude of exposure to the chemicals of potential concern that are present at or being released from the Parson's Site. It involves characterizing the exposure setting and potential pathways, and provides the framework for the characterization of potential health risks. This exposure assessment focuses on potential exposures given existing site conditions, and does not evaluate past exposures.

Exposure pathways are defined as those specific mechanisms by which an individual or a population is exposed to chemical contaminants present at a site or released by a site. Four elements comprise an exposure pathway: (1) a source and mechanism for direct exposure or release of chemicals to the environment; (2) an environmental transport medium (e.g., air, water); (3) a point or site of potential human contact with the contaminant medium (exposure point); and (4) a human exposure route (e.g., ingestion, inhalation, dermal contact). Each exposure pathway, therefore, is a specific mechanism of potential human exposure, and the total exposure of an individual or population may be a composite of several separate exposure pathways.

A conceptual model of the Parson's Site has been developed to characterize the transport of a chemical from the source of release to receptors at potential risk of exposure. Contaminant sources associated with the Parson's Site are categorized as primary or secondary. Primary sources are those hazardous wastes disposed of in the lagoon and other localized areas where wastes were introduced onto the soil surface within the confines of the site, for example, locations of plating solution at above- and below-ground tanks. Secondary sources are those hazardous constituents that are transported or migrate to a new location. These include leachate and soil.

A number of exposure pathways were examined for children and adults in the community, on-site workers, and construction workers. For children this includes ingestion of surface soils, inhalation of surface soils, and dermal contact with surface soils. The same exposure pathways were considered for adults. For on-site workers and construction workers specific exposure pathways include ingestion, inhalation, and dermal contact with surface and shallow soils. A variety of exposure equations and assumptions are used to derive intake estimates for these exposure pathways.

6.3 TOXICITY ASSESSMENT

The objectives of the toxicity assessment are to evaluate the inherent toxicity of the compounds under investigation, and to identify and select toxicological measures for use in evaluating the significance of the exposure. In the development of these toxicological measures for the Parson's Site, available dose-response data from USEPA databases were reviewed on the adverse effects to human receptors.

6.4 RISK CHARACTERIZATION

Risk characterization is the process of integrating results of the exposure and toxicity assessments by comparing estimates of intake or some with appropriate toxicity measures to develop an indication of the potential for adverse effects in exposed populations. The objective of the public health risk characterization is to determine if exposure to chemicals present at or released from the Parson's Site poses an unacceptable risk to human health. Risk characterization is conducted separately for carcinogenic and noncarcinogenic effects. Risk assessment results help determine the need for site remediation. The following is a brief synopsis of the results of the risk characterization for each of the four human receptor categories. It addresses risk associated with exposure to mean concentrations only (except for lead exposure in children, which addresses the reasonable maximum exposure [RME] results). Please refer to Table 1-5 for a summary of soil risk at the Parsons Site.

Direct Contact With Shallow Soils

Current Receptor: Site Worker

The excess carcinogenic risk associated with exposure to site soil is 1 x 10-6, with ingestion of soil containing arsenic driving the risk by dermal contact with benzo(a)pyrene in the soil. No noncarcinogenic adverse health effects are expected as a result of exposure to site soils. The risk associated with site and background soils are identical.

Current Receptor: Adult Trespasser

The excess carcinogenic risk associated with exposure to site soil is 2 x 10-7, with ingestion of soil containing arsenic driving the risk followed by dermal contact with benzo(a)pyrene in the soil. The excess carcinogenic risk for background soils is in the same order of magnitude at 1 x 10-7. Carcinogenic risk of this magnitude is considered acceptable. No carcinogenic adverse health effects are expected as a result of exposure to site or background soils.

Future Receptor: Adult Resident

The excess carcinogenic risk associated with exposure to site soil is 3 x 10-6, with ingestion of soil containing arsenic driving the risk followed by dermal contact with benzo(a)pyrene in the soil. This risk is identical to that associated with background soil and may be considered moderately acceptable. No noncarcinogenic adverse health effects are expected as a result of exposure to site or background soils.

Future Receptor: Child Resident

The excess carcinogenic risk associated with exposure to site soil is 3 x 10-6, with ingestion of soil containing arsenic driving the risk followed by dermal contact with benzo(a)pyrene in the soil. This risk is identical to that associated with background soil and may be considered moderately acceptable. No noncarcinogenic adverse health effects are expected as a result of exposure to site soil. Background soil, with a Hazard Quotient of 1, may be associated with a noncarcinogenic adverse health effect, with ingestion of soil containing manganese driving the risk.

Lead exposure for children was evaluated using the Integrated Exposure Uptake Biokinetic Model for RME concentrations of lead. Results indicated no adverse health effects are anticipated from exposure to lead at RME concentrations in site soil.

Future Receptor: Site Worker

The excess carcinogenic risk associated with exposure to site soil is 1 x 10-6, with ingestion of soil containing arsenic driving the risk followed by dermal contact with benzo(a)pyrene in the soil. This risk is identical to that associated with background soil and may be considered acceptable. No noncarcinogenic adverse health effects are expected as a result of exposure to site or background soil.

Future Receptor: Construction Worker

The excess carcinogenic risk associated with exposure to site soil is 2x10-7, with ingestion of soil containing arsenic driving the risk followed by dermal contact with benzo(a)pyrene in the soil. This risk may be considered acceptable. Exposure to background soil presents a greater, but still acceptable, carcinogenic risk of 6x10-7. No noncarcinogenic adverse health effects are expected as a result of exposure to site or background soil.

Future Receptor: Adult Trespasser

The excess carcinogenic risk associated with exposure to site soil is 1x10-7, with ingestion of soil containing arsenic driving the risk followed by dermal contact with benzo(a)pyrene in the soil. This risk is identical to that associated with background soil and may be considered acceptable. No noncarcinogenic adverse health effects are expected as a result of exposure to site or background soil.

Risk Associated with Deep Soils

The greatest risk associated with the deep soil operable unit is through leaching of contaminants from the site into the groundwater. Groundwater beneath the site has consistently shown risk above the 10-6 and hazard quotients greater than 1 for carcinongenic and noncarcinongenic risk, respectively. It appears that the groundwater will continue to be degraded by contaminants from the former lagoon area and potentially from the suspected dry wells. Maximum Contaminant Levels (MCLs) have also been exceeded for VOCs in groundwater beneath the former lagoon area.

Also, the TCE parts per billion (ppb) concentrations for the deep alluvial aquifer at the site indicate an estimate of the upper confidence level (UCL) may be calculated at 200 ppb. In a residential groundwater ingestion scenario for the excess lifetime cancer risk (ELCR) of 1.0E-04 occurs at a calculation of 160 ppb. Therefore, at 200 ppb the higher end of the Superfund risk range of 1.0E-04 to 1.0E-06 would be expected to be exceeded.

Furthermore, comparisons to the soil screening levels (SSL) guidance to deep soil data indicate SSLs for the protection of groundwater have been exceeded for the following chemicals: TCE, Benzo(a)anthracene, Chrysene, Methylene Chloride, N-Nitrosodiphenylamine, Pentachlorophenol, Arsenic (borderline), Barium, Cadmium (borderline), and Nickel. The conclusions are based upon approximations of the UCLs for these chemicals in deep soil. Therefore, the deep soil data appears to compliment the results of the groundwater monitoring data, i.e., exceedances of SSLs generally results in significant and unacceptable risk in groundwater.

REMEDIAL ACTION OBJECTIVES

During remedial design, preliminary remediation goals will be established to determine soil cleanup levels to address the risks from deep soils to groundwater. These goals shall ensure that the level of compounds in groundwater do not exceed the upper bound of USEPA's acceptable risk range or 10-4 or any Maximum Contaminant Levels (MCLs) or non-zero MCLGs.

DESCRIPTION AND EVALUATION OF ALTERNATIVES

Alternatives were developed and screened so that remedial action technologies would be consistent with the NCP. Alternative retained include the following:

SHALLOW SOIL ALTERNATIVE NO. 1 - "LIMITED" NO ACTION

Description of Shallow Soil Alternative No. 1

A "limited" no action alternative is proposed that includes passive measures such as fencing of the property, and the posting of warning signs, and development of deed notices/restrictions to preclude use of the property from certain activities. Monitoring might also be included to measure contaminant concentrations in surface water runoff and/or dust originating from the site.

Evaluation of Shallow Soil Alternative No. 1

Overall Protection of Human Health and the Environment

The potential exposure of humans to surface soil at the Parson's Site is by the following mechanisms:

- Ingestion of surface soil
- Dermal contact with surface soil
- Inhalation of surface soil particulates.

Risk estimates vary for different scenarios of site use, but based on potential future uses by adults and/or children for recreational play, the surface soil from the site would have an excess risk of cancer of slightly greater than 10-6 (one in 1,000,000). The potential risk is due primarily to ingestion of arsenic and dermal contact with PAHs and metals.

The PAHs probably result from clinkers left from the burning of wood and coal in the locomotives, and the burning of wooden railroad ties. These contaminants may also have been from coal fire furnaces at the site. The manganese concentrations are being comparable to background soils at the site and Illinois background levels for soils.

In summary, the no action alternative for shallow soils would leave surface soil contamination in place that presents a potential cancer threat of slightly more than 10-6 from prolonged skin contact or ingestion to future adult or child residents. Institutional methods (fencing, warning signs) and deed/zoning restrictions can be effective in preventing public access to the Parson's Site.

Compliance with ARARs

There are no numerical standard potential ARARs for specific chemicals in contaminated soils, such as the MCLs that have been promulgated for drinking water under the Federal Safe Drinking Water Act. Instead, when necessary, risk assessment calculations are made to estimated acceptable levels of soil contaminated. These calculations require the estimation of exposure routes, dosages, exposed population characteristics, and other factors for each chemical at each site. The risk assessment for the shallow soils at the Parson's Site has a calculated potential excess cancer risk slightly over 10-6, for some potential future use scenarios.

Reduction in Toxicity, Mobility, and Volume

The limited no action alternative would take no action to reduce the toxicity, mobility or volume of substances present in the shallow soil. Natural processes such as biodegradation, however, would gradually reduce the concentration of organic contaminants over a long period of time. And, it is inevitable that some shallow soils will be removed during the remedial action for the deep soil operable unit, thus further reducing the shallow soils' potential to pose a risk. The use of institutional controls alone would not satisfy the CERCLA (121(b)) preference for treatment as a primary element of a remedial alternative. However, under the current land use scenario, no action is required to reduce TMV based on risk calculations showing no unacceptable adverse health effects for an industrial use category.

Short-Term Effectiveness

Because the limited no action alternative would not involve a remedial construction activity, this screening criteria is generally not applicable. Fencing and warning signs can be partially effective in the short-term to prevent public exposure to on-site contaminated soil.

Long-Term Effectiveness and Permanence

The existing potential residual risk would be unabated should the site be open to the public where dermal contact and accidental ingestion could occur. However, given the low levels of chemicals and extremely low health risk associated with shallow soils, the limited no-action alternative would be effective for a future industrial use scenario. Residential use poses only a slight health risk in a future property use scenario and can effective be controlled with deed/zoning restrictions. Long-term groundwater monitoring is proposed to be completed under the deep soil operable unit.

Implementability

Limitations on access, such as fencing and warning signs, are readily implementable. The placement of deed restrictions to prevent certain types of future site use would require coordination with cognizant local agencies controlling property transfers and land use to ensure compliance.

Cost

Capital costs for Shallow Soil Alternative No. 1, limited no action, are estimated at $33,000 for fencing and warning signs. Annual operations and maintenance costs of $9,500 include monitoring, reporting, and the 5-year public health evaluation. No cost is estimated for institutional controls to enforce deed restrictions. Present worth costs are $179,000 assuming a 5 percent interest rate.

SHALLOW SOIL ALTERNATIVE NO. 2 - EXCAVATION, OFF-SITE TRANSPORT AND DISPOSAL

Description of Shallow Soil Alternative No. 2

The excavation and off-site disposal alternative would involve excavation of contaminated surface soil placement of excavated soil in haul trucks, transport of soil to an off-site disposal facility, and disposal of soil in a contained land disposal unit permitted to accept the waste. The excavation would then be refilled with imported clean fill.

Excavation would be performed using conventional earth moving equipment, though the specific equipment to be used would be identified during the construction stage. Soil sampling would be used to determine the necessary depth of soil excavation or to assure the removal of soil contaminated above selected contaminant levels. Following excavation, the shallow excavated area would be regraded as necessary with clean fill to provide proper drainage and work area elevations, and the site would be revegetated.

The major types of excavation and removal for shallow soils are casting/loading excavation, and hauling excavation. It is expected that around 5,300 cubic yards of soil would be removed from the surface over most of the site. Sampling would be conducted to confirm that the soil being excavated is contaminated to levels requiring remediation.

Excavation can be accomplished with a wide variety of conventional equipment. Basic types of excavation machinery fall into the following general categories:

! Backhoes
! Cranes and attachments (draglines and clamshells)
! Dozers and loaders
! Scrapers.

Off-Site Transport

Transport from the site can be performed with trucks. A variety of haul tracks are available for transporting excavated materials and waste drums.

The transportation of hazardous wastes is regulated by the U.S. Department of Transportation, the USEPA, states, and, in some instances, by local ordinances and codes. In addition, more stringent federal regulations also govern the transportation and disposal of highly toxic and hazardous materials such as PCBs and radioactive wastes. Applicable U.S. Department of Transportation regulations include:

! Department of Transportation 49 CFR, Parts 172-179
! Department of Transportation 49 CFR, Part 1387 (46 CFR 30974, 47073)
! Department of Transportation DOT-E 8876.

The USEPA regulations under RCRA (40 CFR Parts 262 and 263) adopt DOT regulations pertaining to labeling, placarding, packaging, and spill reporting. These regulations also impose certain additional requirements for compliance with the manifest system and record keeping.

In general, haul trucks for off-site transport of hazardous wastes must be DOT approved and must display the proper DOT placard. Contaminated soils can be hauled in box trailers, and drums can be hauled in box trailers or flat bed trucks. The trucks should be lined with plastic and/or absorbent materials.

Off-Site Treatment and Disposal

The off-site disposal facility is a landfill which meets RCRA standards. The RCRA requirements under 40 CFR Part 264 and all associated guidance and regulations are concerned with the proper location, design, construction operation, and maintenance of hazardous waste management facilities. Due to the land ban requirements, it may not be possible to directly landfill the excavated soils. The following values are the guidelines above which stabilization would be required:

Chemical	Level	Method*
Cadmium	0.19 ppm	TCLP
Chromium	0.86 ppm	TCLP
Lead	0.37 ppm	TCLP
Nickel	5.0 ppm	TCLP
Silver	0.3 ppm	TCLP
Total Cyanide	590 ppm	TCA
Amenable Cyanide	30 ppm	TCA

* TCLP = Toxicity Characteristic Leaching Procedure
TCA = Total Constituent Analysis

Since no TCLP analysis was done on the Parson's Site soils, it is uncertain whether the shallow soils would require stabilization prior to disposal. Stabilization treatment can be conducted at many RCRA-approved landfills. However, it is believed that stabilization will not be required for shallow soils.

In addition to the metals content of the shallow soils listed above, PAHs and other organics may determine whether or not the shallow soils can be landfilled directly without treatment. For example, if certain organic constituents exceed the land disposal limits, bioremediation or incineration have to be considered prior to landfilling. The following values indicate that the existing PAH values will probably not trigger the land ban restrictions.

Chemical	Maximum Level Encountered (ppb)	Limit beyond which direct landfilling may not be possible (ppb)	Waste Code*
Benzo(a)anthracene	2,250	3,400	U018
Chrysene	2,500	3,400	U050
Diethylphthalate	380	28,000	U088
Benzo(a)pyrene	1,900	3,400	U022

*- Denotes concentrations for land disposal restriction, not waste designation for contaminants found at the site.

Evaluation of Shallow Alternative No. 2

Overall Protection of Human Health and the Environment

The excavation and off-site disposal alternative would be protective of human health and the environment at the site. Contaminated soil would be removed from the site preventing further potential for surface water runoff contamination, direct soil contact, and groundwater percolation. Overall protectiveness would be dependent on the integrity of the receiving landfill and soil treatment, if any, performed at the receiving facility. If no treatment is employed, the toxicity and volume of the contaminated soils would not be reduced. Treatment by stabilization would increase volume and decrease mobility, but would not affect toxicity. The greatest risk during implementation would be from the transport of a large volume of soil to the landfill. Spills or transport accidents could threaten public health and the environment along the transportation route.

Compliance with ARARs

The excavation and off-site disposal alternative could be designed, implemented, and completed to address all ARARs regarding excavation and transport of hazardous waste. The only significant ARAR issue associated with the alternative relates to RCRA land disposal stipulations for several compounds.

Shallow soils may be classified as F006 waste, as defined in the Federal Register of August 17, 1988, 40 CFR Part 264 through 268. These wastes require stabilization prior to landfilling. TCLP tests are needed to determine if stabilization of the contaminated soil is required prior to disposal.

Reduction in Toxicity, Mobility, and Volume

The off-site land disposal alternative without treatment offers no overall reduction in toxicity and volume. Mobility of the shallow soil contaminants removed from the Parson's Site would obviously be reduced.

Short-Term Effectiveness

Potential concerns with excavation, removal, and off-site disposal are associated with worker safety, short-term impacts, and institutional aspects. Where hazardous chemicals are present, excavation can pose a substantial risk to worker safety. Short-term impacts such as VOCs and fugitive dust emission and contaminated run-off may also be a concern. Preventive measures can be designed and constructed to minimize potential effects to human health and the environment during excavation and transport. Personal protective equipment would be used to protect workers during the action. Dust control measures would be employed to prevent fugitive emissions from affecting the surrounding population and environment. Surface water runoff control measures would be used to prevent contaminant release. Decontamination procedures would be employed to prevent spread of contamination beyond site boundaries.

Excavations and other construction activity performed on the site as part of future remedial actions should be done with an approved health and safety plan in effect. The plan should provide for necessary personnel protective equipment to protect workers. In addition, the plan should provide for air monitoring at the site boundaries to ensure that off-site emissions are not potentially harmful to the public.

It is estimated that this alternative could be accomplished in a 3 to 4 month time frame. If accomplished in a phased manner to accommodate operations at the facility, the implementation period may be longer.

Long-Term Effectiveness and Permanence

Factors considered under long-term protectiveness include magnitude of residual risk, long-term reliability, potential of future public exposure to residual concentrations and potential need for replacement of the remedy.

Magnitude of Residual Risk. The off-site disposal alternative would offer significant long-term effectiveness through the removal of shallow soils potentially impacting surface water and creating a direct contact risk at the site. Removal would eliminate long-term impacts from contaminated shallow soils at the site.

Long-Term Reliability. Because wastes would be removed from the site, overall long-term effectiveness would be dependent on the long-term integrity of the landfill receiving the waste.

Potential of Future Exposure to Residual Concentrations. If all the RCRA requirements are implemented, disposal of the contaminated soil at a Class I landfill is expected to be effective long-term. Since only the top foot of soil is removed, restrictions would apply to future excavation of soils. For example, if soils are removed for a footing of a building, the workers must be properly protected and the soil disposed as a hazardous waste if tests so indicate.

Implementability

The off-site disposal alternative is easily implementable. No unusual difficulty with excavation, transport, and disposal is expected. A potential implementability issue is related to the capacity of off- site facilities to accept soil from the Parson's Site.

At this time there are no difficulties identified in obtaining permits or approvals related to implementation of this alternative. The off-site facility destination would have to conduct screening tests to determine if the soils can be accepted at these facilities.

The equipment necessary to implement this alternative is readily available. Standard construction equipment could be used for excavation activities. The excavated areas would have to be refilled with clean fill which is readily available from nearby locations. For work on-site, health and safety (OSHA-certified) trained personnel must be used.

Cost

The estimated capital and present worth cost for excavation of shallow soils and disposal in an off-site disposal facility without treatment is $1,802,000. O&M costs are $9,500. Present worth costs are 1,948,000, assuming a 5 percent interest rate and 30-year life.

If stabilization treatment of the soil is required prior to disposal, the estimated capital and present worth cost increases to $2,696,000 based on an added cost of $135 per cubic yard for chemical stabilization charged at the disposal site. The soil expands when removed from the ground approximately 25 percent, so 6,625 cu. yds. of soil are estimated for stabilization.

SHALLOW SOIL ALTERNATIVE NO. 3 - EXCAVATION, ON-SITE FIXATION AND DISPOSAL INTO AN ON-SITE CORRECTIVE ACTION MANAGEMENT UNIT (CAMU)

Description of Shallow Soil Alternative No. 3

The major shallow soil contamination is estimated as the upper one foot of the identified contaminated soils located in an area of approximately 144,000 square feet covering most of the site. The estimated volume of shallow soil in these areas is approximately 5,300 cubic yards. When excavated, this soil would expand to approximately 6,625 cubic yards. The shallow soils contain volatile and semivolatile organic compounds, inorganic compounds and cyanide. The excavation, on-site fixation (stabilization) and on-site disposal alternative consists of excavating contaminated surface soils at the site, stabilizing the soils on-site and disposing of the stabilized material in an approved corrective action management unit (CAMU) constructed on-site. Excavation of the soils would use conventional equipment and be similar to excavation for purposes of off-site disposal.

The equipment use for soil stabilization is similar to that used for cement mixing and handling. It includes a feed system, mixing vessels, and curing area. Numerous firms offer on-site chemical stabilization services and provide expertise in selecting critical parameters, including selection of stabilizing agents and other additives, the waste-to-additive ratio, mixing, and curing conditions. The stabilized soil would be placed directly into an on-site corrective action management unit (CAMU).

The CAMU could be designed to meet the standard of RCRA 40 CFR, Part 264. The CAMU design used for cost estimating purposes consists of the following layers, from the bottom to the top:

- A graded native soil foundation
- 2-foot layer of clay, or low permeable admixtures
- 60 mil HDPE liner
- Geotextile separation layer
- 2-foot native soil protective layer
- 15-foot (average) layer of soils of concern placed in a cell
- 12-inch sand layer over treated soil
- 60 mil HDPE liner
- 12-inch sand layer above membrane
- Geotextile separation layer
- 18-inch fill layer using native soil
- 6-inch seeded top soil layer.

Other designs might be acceptable and can be considered during design phases if this alternative is selected. The above cell cross-section is a typical design. The required cell area would be approximately ½ acre, including a perimeter road and drainage swales.

The chemical stabilization would be done on-site adjacent to the location selected for the CAMU. Bench-scale tests on representative soil samples would be necessary to determine the best type and quality of additives to achieve good chemical stabilization of the soil. The TCLP test would be conducted on the stabilized samples to assess the reduction in leachability of the contaminants in the soil. Bench-scale tests have not been done, so the quality and kind of additives listed in the cost estimate have no basis, except that portland cement (or fly ash) at 0.3 lb/lb of soil and sodium silicate at 0.15 lb/lb of soil have provided a well-established soil mixture elsewhere.

The temporary on-site solidification facility and labor to operate it is usually provided by remediation contractors who specialize in chemical stabilization. Mobile units are brought to the site to handle, meter, and mix the stabilization additives, water, and the soil being treated.

The temporary processing plant, storage area and work space is estimated to require about ½ acre, in addition to the area required for the CAMU. Preparation for the temporary solidification facility would include clearing a flat site, constructing several concrete pads, constructing an access road suitable for heavy trucks, and providing water, electricity, and sanitation facilities. In addition, the CAMU would have to be constructed to be ready to accept the stabilized soil mixture.

Long-term monitoring would be required. These monitoring activities would have to meet the substantive RCRA requirements for closure under 40 CFR Part 264 - Subpart G.

The shallow surface soil that is removed would be replaced by clean fill soil from off-site.

Evaluation of Shallow Soil Alternative No. 3

Overall Protection of Human Health and the Environment

Shallow Soil Alternative No. 3 would protect human health and the environment through containment of the soils of concern in a RCRA design cell (CAMU). The cell would be designed to protect human health and the environment by preventing direct contact with materials, preventing surface water runoff, and reducing surface water percolation to a negligible quantity. The fact that the soils would be chemically stabilized makes the alternative more protective than if the soils were not stabilized prior to placement into the CAMU. The contaminants of concern would be in a stabilized matrix within the CAMU, as well as being protected by the bottom and top liners.

Long-term maintenance of the cell and monitoring would be necessary for the alternative to remain protective. Since chemicals of concern are left on-site, a review every 5 years is necessary, and will help to ensure that the public is protected.

Compliance with ARARs

Soil which contains constituents of listed wastes should be treated to protective levels, but contaminated soil disposed on-site in a CAMU is not subject to either LDR treatment standards or RCRA design requirements for a final cover. It is anticipated that the TCLP tests on the stabilized soil material will meet federal and state requirements. However, until treatability tests are conducted, stabilization is not a certainty. Considering the relatively low health risk of the stabilized soil contained in an CAMU, it may be considered that the soils are treated to protective levels.

Reduction in Toxicity, Mobility, and Volume

The on-site land disposal alternative offers no reduction in toxicity or volume. Mobility of the compounds of concern would be significantly reduced through the placement of the materials into a controlled CAMU. Chemical stabilization reduces mobility further because contaminants are trapped in a solid matrix before placement into the CAMU. The CAMU would be designed to reduce the mobility to near zero with its double liner. Mobility reduction would be dependent on the long-term integrity of the CAMU.

Short-Term Protectiveness

Excavation, stabilization and redisposal into the on-site cell could be designed and constructed to minimize potential effects to human health and the environment. Personal protective equipment would be used to protect workers during the implementation of the alternative. Furthermore, access would be restricted to areas where soil is being excavated and handled. Decontamination procedures would be employed to prevent spread of contamination by equipment, e.g., by dirt on tires.

Potential health risks to the community during implementation can be mitigated with proper design and implementation of actions. The public would experience some additional truck traffic, heavy equipment noise, and dust. Implementing dust control measures, utilizing truck decontamination procedures and scheduling construction activities properly should minimize construction disturbances. It is anticipated that inhalation of soil particles and vapors will not be a significant problem.

Public health risks caused by accidental or catastrophic events occurring during construction and operation of this alternative are primarily related to accidental releases of untreated soil. Since all the work would take place on the Parson's Site, the primary methods of significant release would be through washing away of stored soil during a severe rainstorm.

Significant adverse health effects for site workers and area residents during construction are not expected. Proper use of personal protective equipment for site workers, as defined in a health and safety plan developed for work performance, will provide sufficient protection.

Construction of the CAMU and facilities required to accommodate the portable soil chemical stabilization process equipment (e.g., concrete pads, utilities) should require about 9 months including planning, design, construction bidding, permits, etc. Construction of the CAMU is estimated to require 2 months. Excavation, chemical stabilization of the soil, and placement into the CAMU should proceed rapidly and is estimated at 3 months duration. The total estimated time of construction for this alternative is 14 months.

Operational and maintenance for the CAMU would be required well into the future, but for present worth costing purposes on O&M period of 30 years is used based on general practice at other sites. Of course, O&M costs would continue beyond 30 years, but the present worth of money spent in the distant future is relatively small.

Long-Term Protectiveness

Factors considered under long-term protectiveness include magnitude of residual risk, long-term reliability, potential of future public exposure to residual concentrations and potential need for replacement of the remedy.

The health risk from the stored materials would be minor after placement into the CAMU. Required monitoring would ensure that the health risk would be minimal. Construction of the cap and surface water control channels should virtually eliminate residual risk of surface water contamination. A properly located and graded site with properly designed flood control channels should be safe from erosion associated with any storm event.

Assessing long-term reliability to provide continued protection basically involves studying the potential for failure of the technical components of this alternative and the degree of risk a failure poses. All of the technical components are reliable, proven technologies.

Long-term reliability is highly dependent on the continued adequate inspection, monitoring and maintenance of the CAMU. It is essential that the present and future ownership of the property be legally required to prevent unrestricted access to and disruption of the CAMU by uncontrolled activities.

Human exposure to residuals could occur primarily because the stored contaminated soils on-site reach human receptors via an exposure pathway. Potential exposure pathways applicable to the site assume failure of the containment provided by the CAMU. It is difficult to envision a sudden significant failure in the CAMU. Failure in CAMUs occur gradually and are the direct result of inadequate inspection, monitoring and prompt repair of the deficiencies identified. As long as proper O&M and institutional controls are maintained, this alternative appears to pose little risk of future public exposure to residual chemicals of concern.

The integrity of the CAMU is largely dependent upon the integrity of the cover constructed over the stored soil.

Implementability

All of the technologies included in this shallow soil alternative are standard and accepted technologies. Adequate space exists to construct the CAMU and perform the chemical stabilization. Electric power and other utilities are available. No unusual difficulty with construction or operation is expected.

At this time there appears to be no reason why the proposed technologies in this alternative could not meet the anticipated performance criteria. As discussed earlier, reliability is tied closely to assured adequate operation and maintenance, which is a prerequisite to performance.

None of the components of this alternative should involve unusual delays in scheduling or deliveries.

This shallow soil alternative does not preclude additional future remedial action, if necessary. Potential future remedial actions that might be deemed necessary include replacement of significant components of the CAMU. This can be readily done. Removal of the stabilized soil from the CAMU and redisposal of the soil off-site at an approved facility would be expensive but could be done. The clay, sand, and other materials brought in to construct the CAMU would also have to be removed.

Monitoring the effectiveness of the CAMU can be done by means of monitoring fluids entering the space between the bottom double liner, and sampling of monitoring wells near the CAMU, as required by regulations governing CAMUs.

The equipment necessary to implement this alternative is readily available. This includes standard construction equipment and general contracting personnel to construct the CAMU. For work on-site, health and safety trained personnel must be used. At least 4 firms are available that provide portable equipment and trained labor to chemically stabilize soil. At least 4 firms are available that manufacture and provide trained labor to install liners for the bottom and top of CAMUs.

Cost

The estimated capital cost for Shallow Soil Alternative No. 3 is $1,979,000, and the estimated annual operation and maintenance cost is $54,000. Present worth cost is $2,809,000, assuming a 5 percent interest rate and 30-year project life.

SHALLOW SOIL ALTERNATIVE NO. 4 - CLAY AND CONCRETE COVERS

Description of Shallow Soil Alternative No. 4

The final shallow soil alternative is covering the top foot of contaminated soil with clay or concrete covers. Covering of the shallow soil at the Parson's Site would cover approximately 110,000 sq. ft. on the entire west side of the building and 40,000 sq. ft. on the entire east side of the building, a total of 150,000 sq. ft. It is assumed that the entire area would be covered because it would be impractical to construct a patch work of "band-aid" like small covers. For estimating purposes, it is assumed that the 110,000 sq. ft. of cover on the west side of the building would be constructed of one foot of clay, since there is no vehicular traffic in this area. However, it is assumed that the 40,000 sq. ft. of cover on the east side of the building would be 6 inches of concrete over one foot of gravel in order to accommodate truck and auto traffic occurring there. Beneath the covers existing soils would be graded to provide proper slopes and compacted as a foundation for placement of the covers.

Evaluation of Shallow Soil Alternative No. 4

Overall Protection of Human Health and the Environment

Shallow Soil Alternative No. 4 would protect human health and the environment through containment of the soils under a cover. The cover would protect human health and the environment by preventing direct contact with soils of concern, preventing contamination of surface water runoff, and preventing airborne transport of soil particles. Surface water percolation through soils would also be reduced, but this is not a primary function since the PAH contaminants of concern have not migrated with percolating water. Since chemicals of concern are left on-site, the mandatory review every 5 years is necessary and will help to ensure that the public is protected.

Compliance with ARARs

There are no applicable standard chemical ARARs for soils left in place. Chemical limits are based on a risk analysis. There are no action-specific ARARs specifically covering the design of a cover over lightly contaminated soil left in place. The proposed covers partially satisfy the intent of regulatory designs for caps, though they deviate in design specifics from typical RCRA caps intended for landfills. RCRA design requirements for a final cover are not ARARs for contaminated soil that remains in place.

Reduction of Toxicity, Mobility, and Volume

Contaminated surface soils would remain in place. However, covers would greatly reduce the mobility of the contaminants by largely eliminating the pathways of surface water runoff, airborne dust particles, and direct contact. Toxicity and volume would not be reduced.

Short-Term Protectiveness

Planning design, permits, and construction bidding would require approximately 6 months. Preparation of the subgrade followed by construction of the respective clay and concrete covers would require approximately 3 months. The total estimated time of construction is 11 months.

Minimal maintenance for the covers would be required far into the future, but for present worth costing purposes, an O&M period of 30 years is used based on general practice at other sites.

Long-Term Protectiveness

Factors considered under long-term protectiveness include magnitude of residual risk, long-term reliability, potential of future public exposure to residual concentrations, and potential need for replacement of the remedy.

As long as the covers are intact, the health risk from the remaining contaminated shallow soil beneath the covers would be minimal.

Construction of the covers and surface water control channels should virtually eliminate residual risk of direct contact, airborne particulates and surface water contamination from the Parson's Site.

The covers proposed are not primarily intended to reduce infiltration of groundwater since the PAH contaminants of concern do not appear to be leaching. Therefore, the IEPA does not intend to repair minor cracks in the cover. Only areas were significant portions of the cover are ineffective will be repaired.

The use of covers should minimize restrictions on future industrial use of the property. It will be necessary to have deed restrictions on future excavation handling and disposal of contaminated soil located below the covers. For example, excavations for building footings or to install pipelines will have to be done with appropriate worker personnel protection and proper handling and disposal of contaminated soil.

All of the technical components proposed are reliable, proven technologies. This alternative does not include any experimental or innovative alternative technologies. The concrete cover would have mesh reinforcing and would have excellent resistance to cracking under all but severe earthquakes, and could be readily repaired if damage did take place.

Covers generally require periodic repairs. A common practice is to assume that the cover is essentially replaced every 20 to 30 years, and estimated annual O&M costs include a cost for a fraction of cover replacement, e.g., 1/30 of the cover cost.

Implementability

All of the technologies included are standard and accepted.

At this time there appears to be no reason why properly designed covers could not meet anticipated performance criteria. Adequate maintenance is a prerequisite to performance.

None of the components of this alternative should involve unusual delays in scheduling or deliveries.

Remedial actions that simply puncture the cover, such as extraction well construction, pose no difficulty. Obviously, excavation of large areas of soil would disrupt the covers.

Monitoring the effectiveness of the covers can be done by periodic visual inspection and sampling of monitoring wells beneath the covers.

There are no technical reasons that would preclude maintenance activities.

At this time there are no difficulties identified in obtaining permits/approvals related to implementation of this alternative for shallow soil.

Once constructed, there are no anticipated residuals that would require disposal.

The equipment necessary to implement this alternative is readily available. This includes standard construction equipment and general contracting personnel. For work on-site, health and safety trained personnel must be used.

Cost

The estimated capital cost for Shallow Soil Alternative No. 4 is $1,147,000, and the estimated annual operation and maintenance cost is $52,000. Present worth cost is $1,946,000, assuming a 5 percent interest rate and 30-year project life.

DEEP SOIL ALTERNATIVE NO. 1- NO ACTION

Description of Deep Soil Alternative No. 1

The no action alternative literally would involve no action to remediate deep soil contamination at the Parson's Site. The cost would be zero.

A "limited" no action alternative can also be proposed that includes passive measures such as groundwater monitoring, the posting of warning signs and deed restrictions to prevent use of the property for certain kinds of activities. This alternative was covered under the limited no action alternative for shallow soils previously.

Monitoring would be conducted to determine if the VOCs left in the deep soils continue to be a source for groundwater contamination. Cost estimates assume quarterly sampling of 10 wells. In addition to monitoring, the IEPA may also require annual reports and USEPA would require a public health evaluation every 5 years.

Evaluation of Deep Soil Alternative No. 1

The following information compares the limited no action alternative with the criteria that aid in evaluating the alternatives under the NCP.

Overall Protection of Human Health and the Environment

The limited no action alternative would do nothing physically over time to protect human health and the environment. Release of VOCs from deep soils to the groundwater would continue unabated. The estimated risk from groundwater ingestion exposure resulting from deep soil leaching is currently estimated as 4 x 10-5 for maximum values. Since the hazard quotient is also greater than 1 (i.e., 5.3), a significant risk to groundwater would be left at the site.

Compliance with ARARs

There are no numerical standards for potential ARARs for specific chemicals in contaminated soils, such as the MCLs that have been promulgated for drinking water under the Federal Safe Drinking Water Act. Instead, when necessary, risk assessment calculations can be made to estimate acceptable levels of soil contamination. The risk-based numbers are estimated based on partitioning assumptions in the RI Report and the exposure routes of the contaminated groundwater.

Reduction in Toxicity, Mobility, and Volume

The limited no action alternative would not reduce toxicity, mobility, or volume of contaminated deep soils and chemicals. Natural hydrolysis, aerobic and anaerobic biodegradation, and sorption, however, would gradually reduce VOC concentrations in the soil over a long period of time. However, natural attenuation would not sufficiently reduce VOCs to acceptable levels or adequately protect groundwater from further degradation.

Short-Term Effectiveness

Because the limited no action alternative would not involve a remedial activity, this screening criterion is not applicable.

Long-Term Effectiveness and Permanence

The limited no action alternative would not effectively provide long-term human health and the environmental protection. Releases of chemicals of concern from the deep soil source would continue and the existing residual risk to human health, safety, public welfare, and to the environment would continue.

Implementability

A long-term groundwater monitoring program is readily implementable and was included in the cost analyses for all deep soil operable unit alternatives. Long-term groundwater monitoring will incorporate the requirements of both operable units.

Cost

The annual O&M for a long-term groundwater monitoring program is being proposed for the deep soil operable unit (and will include the needs of the shallow soil operable unit). O&M costs are estimated at $29,000. The capital cost is considered zero. The present worth is $446,000, assuming a 5 percent interest rate and 30 year period.

DEEP SOIL ALTERNATIVE NO. 2 - EXCAVATION, OFF-SITE TRANSPORT AND DISPOSAL/TREATMENT

Description of Deep Soil Alternative No. 2:

The excavation and off-site disposal alternative would involve excavation of contaminated deep soil from the west part of the old lagoon, placement of excavated soil in haul trucks, transport of soil to an off-site disposal facility, and disposal of soil in a contained land disposal unit permitted to accept the waste. The excavation would then be refilled with imported clean fill, as previously discussed. If implemented, this alternative would require excavation of an estimated 5,000 cu yds. of soil, measured in-situ. If excavated, the soil could expand to approximately 25 percent to 6,250 cu yds.

The second area of concern is northeast of the building. Following completion of the remedial investigation in 1993, the agencies conducted additional field testing in an attempt to located former dry wells reported to have been located northeast of the building. Only one well was found, however additional wells are suspected to exist and additional sampling will need to be conducted to determine the exact number and location during the remedial design phase. For the purposes of remediation, it is estimated that the additional deep soil area of concern northeast of the building has an area of 3,500 sq. ft. And an average depth of 4 ft. resulting in an in-situ volume of approximately 520 cu yds. An expansion of 25 percent after excavation will result in an above-ground volume of 650 cu yds.

The two areas of concern described above are shown in Figure 1-1 and would total an estimated 5,500 cu yds. of soil in-situ and 6,900 cu yds. of expanded soil after excavation, given the assumptions made.

Excavation of Soil

Excavation can be performed using conventional earthmoving equipment. Backhoes and loaders are good candidates for excavation of soil down to 20 feet. For example, to excavate the area, a 2 yd3 hoe
size may be used. These hoes have a maximum depth of excavation of 30 feet. Assuming a bucket capacity of 2 yd3, a cycle time of 3 minutes an average bucket factor of 0.66, 22 cu yd of soil can be excavated every working hour. This would amount to approximately 176 cu yd of excavation a day. The total deep soil excavation would require approximately 6 weeks of excavation time. Taking soft sampling and hazardous waste work into consideration, it would take probably 3 months for the excavation.

Off-Site Transport

Transport from the site can be performed with haul trucks. A variety of haul trucks are available for transporting excavated materials and waste drums. Haulers are large, rubber-tired vehicles available as single-trailer, 2-or 3- axle vehicles, and as double-trailer, multiple-axle haulers. Their rated haul capacities range from 1 to 100 tons, and they are available as bottom-dump, rear-dump, and side-dump vehicles. For costing purposes, a track of 20 tons was assumed. Soil can be loaded onto haulers using backhoes, draglines, shovels, or loaders.

The transportation of hazardous wastes is regulated by the U.S. Department of Transportation, the USEPA, states, and, in some instances, by local ordinances and codes. In addition, more stringent federal regulations also govern the transportation and disposal of highly toxic hazardous materials such as PCBs and radioactive wastes. Applicable U.S. Department of Transportation regulations include:

! Department of Transportation 49 CFR, Part 172-179
! Department of Transportation 49 CFR, Part 1387 (46 CFR 30974, 47073)
! Department of Transportation DOT-E 8876.

The USEPA regulations under RCRA (40 CFR Parts 262 and 263) adopt DOT regulations pertaining to labeling, placarding, packaging, and spill reporting. These regulations also impose certain additional requirements for compliance with the manifest system and recordkeeping.

In general, haul trucks for off-site transport of hazardous wastes must be DOT approved and must display the proper DOT placard. Contaminated soils can be hauled in box trailers, and drums can be hauled in box trailers or flat bed trucks. The trucks should be lined with plastic and/or absorbent materials. Before a vehicle is allowed to leave the site, it should be rinsed or scrubbed to remove exterior contaminants. Both bulk liquid containers and box trailers should be checked for proper placarding, cleanliness, tractor-to-trailer hitch, and excess waste levels. Box trailers should be checked to ensure correct liner installation, secured cover tarpaulin, and locked lift gate.

Off-Site Treatment and Disposal

The off-site disposal facility (landfill) will meet RCRA standards. The RCRA requirements under 40 CFR Part 264 and all associated guidance and regulations are concerned with the proper location, design, construction, operation, and maintenance of hazardous waste management facilities. These requirements preclude landfilling in areas of seismic instability, in a 100-year flood-plain, and where the integrity of the liner system would be adversely affected. Due to land ban requirements, however, it may not be possible to directly landfill the excavated soils. TCLP tests for inorganics will be conducted on the deep soils to determine if stabilization is needed prior to disposal. In addition to the inorganic concentrations, the presence of organics in deep soils may require pretreatment. Some creosote compound maximum values may trigger a requirement for incineration as the best available treatment (BAT). A representative deep soil sample in the lagoon area will be taken to make a final assessment. The VOC concentrations (first 4 chemicals in the table below) are not a problem in terms of landfilling, as shown below.

Chemical	Maximum concentration level (ppb)	Limit beyond which land filling may not be possible (ppb)	Waste Code*
1,2-Dichloroethylene	4	30,000	U079
1,1,1-Trichloroethane	6	6,000	U226
Trichloroethylene	120	6,000	U228
Toluene	2	10,000	U051 (Creosote)
Naphthalene	2,500	5,600	U051 (Creosote)
Pentachlorophenol	4,200	7,400	U051 (Creosote)
Phenanthrene	2,850	5,600	U051 (Creosote)

*- Denotes concentrations for land disposal restriction, not waste designation for contaminants found at the site.

Evaluation of Deep Soil Alternative No. 2

Overall Protection of Human Health and the Environment

The excavation and off-site disposal alternative would be protective of human health and the environment at the site. Contaminated soil would be removed from the site preventing further potential for groundwater percolation. Overall protectiveness would be dependent on the integrity of the receiving landfill and soil treatment, if any, performed at the receiving facility. If no treatment is employed, toxicity and volume of soils would not be reduced. Treatment by stabilization would increase volume and decrease mobility, but would not affect toxicity. Mobility at the site would be eliminated, but long-term mobility reduction would be dependent on the treatment of the soil and the integrity of the receiving landfill.

Compliance with ARARs

The excavation and off-site disposal alternative could be designed, implemented, and completed to address all ARARs regarding excavation and transport of hazardous waste. The only significant ARAR issue associated with the alternative relates to RCRA land disposal stipulations for several compounds. Deep soils may be classified as F006 or FO09 waste, which requires stabilization prior to landfilling. TCLP tests will be taken to determine if stabilization is required prior to disposal. Concentrations do not suggest landfilling will be a problem; however, LDRs may be exceeded during remediation since concentrations are not known for all material proposed to be excavated.

For contaminated soil which is excavated for disposal off-site, a treatability variance for soil and debris according to Superfund LDR guide 6A could be appropriate in lieu of the treatment standards in 40 CFR Part 268 Subpart D. After treatment, if the soil still contains the constituents of listed waste, it may be disposed of off-site only in a Subtitle C landfill. If the contaminants in the soil have been treated to below health-based levels, then the soil no longer "contains" the listed waste and need not be placed in a RCRA landfill.

Reduction in Toxicity, Mobility, and Volume

The off-site land disposal alternative without treatment offers no reduction in toxicity and volume. Mobility of the shallow soil contaminants removed from the Parson's Site would obviously be significantly reduced. Mobility reduction at the receiving facility would be dependent on treatment and the long-term stability of the facility. If stabilization is used prior to disposal, this would increase the volume and decrease the mobility.

Short-Term Effectiveness

Potential concerns with excavation, removal, and off-site disposal are associated with worker safety, short-term impacts, and institutional aspects. Where hazardous chemicals are present, excavation can pose a substantial risk to worker safety. Short-term impacts such as VOCs and fugitive dust emission and contaminated run off may also be a concern. Preventive measures can be designed and constructed to minimize potential effects to human health and the environment during excavation and transport.

Personal protective equipment would be used to protect workers during the action. Dust control measures would be employed to prevent fugitive emissions from affecting the surrounding population and environment. Surface water runoff control measures would be used to prevent contaminant release. Decontamination procedures would be employed to prevent spread of contamination beyond site boundaries. However, as shown in the table below, there is minimal risk due to expose from the shallow soils at the site.

The estimated mean and maximum excess cancer risk due to inhalation for the type of receptors above are shown in the table below:

Excess Cancer Risk Associated with Inhalation of
Surface Soils from the Parson's Site

	Excess Cancer Risk Associated with Exposure to:	
Type of Receptor	Mean Soil Concentrations	Maximum Soil Concentrations
Adult Residents	1 x 10-6	5 x 10-6
Children	1 x 10-6	2 x 10-6
On-Site Adult Workers	3 x 10-6	1 x 10-5
Construction Workers	6 x 10-7	2 x 10-6

The hazard index, which estimates noncarcinogenic effects, is well below one for all types of receptors. The risk assessment clearly indicates that inhalation of soil is not an important pathway for the soil contaminants present under the exposure assumptions made in the risk analysis for remedial activities. Therefore, during remediation, deep soils will be the only major driving factor in development of health and safety procedures for construction activities.

Excavations and other construction activity performed on the site as part of future remedial actions will be done with an approved health and safety plan in effect. The plan should provide for necessary personnel protection equipment to protect workers. In addition, the plan should provide for air monitoring at the site to ensure that off-site emissions are not potentially harmful to the public.

It is estimated that this alternative could be accomplished in a 3 to 4 month time frame. If accomplished in a phased manner to accommodate operations at the facility, the implementation period may be longer.

Long-Term Effectiveness and Permanence

Factors considered under long-term protectiveness include magnitude of residual risk, long-term reliability, potential of future public exposure to residual concentrations and potential need for replacement of the remedy.

The off-site disposal alternative would offer significant long-term effectiveness through the removal of deep soils potentially impacting surface water and creating a direct contact risk at the site. Removal would eliminate long-term impacts from contaminated soils at the site.

Because wastes would be removed from the site, overall long-term effectiveness would be dependent on the long-term integrity of the landfill receiving the waste. The alternative would be "permanent" for the site, but not necessarily permanent for the waste.

If all the RCRA requirements are implemented, disposal of the contaminated soil at a Class I landfill is expected to be effective long-term.

Implementability

The off-site disposal alternative is easily implementable. No unusual difficulty with excavation, transport, and disposal is expected. A potential implementability issue is related to the capacity of off-site facilities to accept soil from the Parson's Site. Before accepting a waste, waste management facilities will run a series of tests including TCLP to determine if there would be a problem with land ban requirements.

There are no difficulties identified in obtaining permits or approvals related to implementation of this alternative. The off-site facility destination would have to conduct screening tests to determine if the soils can be accepted at their facility.

The equipment necessary to implement this alternative is readily available. Standard construction equipment could be used for excavation activities. The excavated areas would have to be refilled with

clean fill which is readily available from nearby locations. For work on-site, health and safety (OSHA-certified) trained personnel must be used.
Cost

The estimated capital and present worth cost for excavation of deep soils and disposal in an off-site disposal facility with treatment is $3,255,000. O&M costs are $29,000 annually for monitoring groundwater and reporting. Present worth cost is 3,701,000. Cost also includes relocation of City water main.

DEEP SOIL ALTERNATIVE NO. 3 -- SOIL VAPOR EXTRACTION TO REMOVE VOCS

Description of Deep Soil Alternative No. 3:

This alternative involves the installation of a soil vapor extraction system in the 6,625 sq. ft. area on the west part of the old lagoon, to extract residual VOCs from deep soils.

The conceptual soil vapor extraction system consists of wells placed in the ground above the water table which force air to flow through pore spaces of unsaturated contaminated soil. The moving air collects volatile organic vapors. The physical principle underlying the process is the volatility of the compound of interest. Compounds which are volatile preferentially partition in a soil/water/air system into the air phase; they will diffuse into the air phase in an attempt to reach an equilibrium. The air can then be removed and the volatile compounds are collected for disposal. However, based on technical information, SVE is rarely successful by itself and requires some enhancement to free contaminants to a vapor phase form for recovery (i.e., in combination with air sparging).

The underground component consists of wells inserted into the contaminated area that extract soil gases and vapors by employing a blower. Some installations have used additional air injection wells connected to positive pressure pumps to augment the subsurface air flow. Simple open wells with no positive pressure are also used. The aboveground support equipment includes a blower, a condenser, and some technique to manage the extracted gases. Techniques for dealing with the extracted gases include thermal destruction, activated carbon adsorption, and atmospheric release. Atmospheric release would not be acceptable because of the proximity of residences to the site. The most common treatment method is an activated carbon adsorption system.

The components of a vacuum extraction system are relatively simple. The production wells are installed to the lowest depth of the contaminated vadose zone (20 feet below the ground level), but above the groundwater table. The wells are slotted in the interval between the water table and the top of the contaminated soil. The upper portion of the well is sealed. The top of the well is connected to a blower that draws air up the pipe and forces it through a condenser (to remove water vapor from the gas stream). The condenser tank holds the condensate and any associated contaminants during an interim period before disposal. The condensate can be transported off-site for disposal, or treated on-site using the groundwater pump and treat system, if one is constructed. The VOCs in the gas stream are adsorbed on the surface of activated carbon.

Vent holes may be sunk to provide increase air flow through the lower levels of the soil, and monitoring wells may be installed to determine vacuum levels and/or vapor concentrations as a function of distance or time. It is also common to cover the ground around the surface of the contamination zone with plastic to and operated to meet potential action-specific ARARs that include air toxicity guidelines, hazardous waste treatment guidelines, and treatment of residuals guidelines.

Two wells 40 feet apart with a design flow of 20 cu ft/min each are assumed at this site. The two soil gas extraction wells would be installed approximately 40 to 60 feet apart at an average depth of 18 feet. Well material is assumed to be a 3-inch PVC piping that is slotted throughout the bottom 13 feet with a spacing of 0.06 inches. The two wells would be connected via surface manifold pipes to a single blower. A vacuum is provided by either a displacement blower or a centrifugal blower. For this type of soil, a vacuum of 4 inches Hg is recommended at a total design flow of 40 cu ft/min.

Soil vapor extraction of the deep soil will not be subject to RCRA ARARs, but any treatment residue, such as spent activated carbon, which is generated in capturing the volatiles must be disposed of as a hazardous waste. Alternatively, spent carbon may be regenerated only in a unit which is in compliance with RCRA regulations for miscellaneous units, 40 CFR Part 264 Subpart X.

Short-Term Protectiveness

Potential health risks to the community during implementation can be mitigated with proper design and implementation of actions. The system would be fenced off during implementation, limiting site access. Precautionary measures may include continuous monitoring of GAC breakthrough, properly locating and monitoring pipelines that carry condensate, installing instrumentation and warning devices that alert operations, and establishing an emergency response plan for the handling of hazardous materials from accidental release.

Long-Term Protectiveness

Factors considered under long-term protectiveness include magnitude of residual risk, long-term reliability, potential of future public exposure to residual concentrations and potential need for replacement of the remedy.

The VOCs in the deep soil at the Parson's Site are considered a source of VOC contaminant migration to groundwater. Based on experience at other sites, the soil VOC concentration may be reduced from 70 to 90 percent by soil vapor extraction. The remaining residual VOCs in the deep soil will be a less significant source of VOCs for future groundwater contamination.

Soil gas extraction will have no effect upon existing groundwater contaminant concentrations. The removal of VOCs from the deep soil source at the Parson's Site should shorten the time required to cleanup groundwater, but there is no way to predict by how long. As previously noted, there appears to be potential source or multiple source groundwater contamination in areas downgradient from the Parson's Site. The area-wide groundwater problem must be remediated to significantly reduce the magnitude of residual risk.

Long-Term Reliability. Soil gas extraction is a short-term action. All of these technical components are reliable, proven technologies.

Potential of Figure Exposure to Residual Concentrations. The deep soil contamination by definition is not readily accessible to the public and the potential for future direct exposure to residual concentrations is minimal. The principal pathway for human exposure is through leaching of the contaminants from the deep soil into the groundwater and subsequent use of the groundwater for domestic purposes. This remedial alternative significantly may reduce future risk specifically from the contaminants at the Parson's Site.

There is the potential for release of contaminants through construction on the property. Deed restrictions would be necessary to minimize this danger.

Potential air impacts from the site primarily would be from untreated soil gas emissions. The air emissions (VOCs) would be treated with activated carbon beds. An on-line VOC monitor can be provided on the carbon bed discharge to provide alarm and shutdown, if a VOC breakthrough occurs.

Future construction involving deep excavation could, of course, expose workers to deep soil contamination for short periods of time and, in addition, potentially move contaminated soils to the surface where they could be accessible for long-term human exposure. Deed restrictions would be necessary on the Parson's property to require that proper precautions are taken during future construction involving excavation.

Reduction of Toxicity, Mobility, and Volume

The soil gas extraction treatment concentrates the VOC in the soil gas onto the adsorptive carbon, thereby reducing volume. Obviously, mobility is also greatly reduced. The toxicity is reduced to the extent that the condensate is treated and/or the carbon is thermally regenerated. Overall, this alternative offers reduction in toxicity, mobility and volume of VOCs, however an estimated 10-30% of the VOCs could potentially remain as a source for further groundwater contamination. Obviously, soil vapor extraction will not affect metals and non-volatile organics. Groundwater in the vicinity of the deep soil contamination that is affected by metals and other less mobile contaminants can be extracted with a well.

Implementability

The system could be readily implementable to remediate deep soils at the Parson's Site. Adequate space exists to construct the off-gas treatment system and to install all the required piping. Electric power and other utilities are also available. No unusual difficulty with construction is expected. However, operations would be impeded by adverse local geological conditions (e.g., clay lenses), soil moisture content, the Non-Aqueous Phase Liquid (NAPL) located near the lagoon, the sludge seam located within the lagoon, potential affects from the dry wells, and the presence of the unknown PCE source(s). SVE was determined to be an unacceptable alternative because it cannot be implemented with a high degree of certainty for success removal of VOCs or with adequate assurances that the system could perform over a reasonable period of time based on the factors stated above.

Pretreatment tests are required to establish the final design criteria. Typically, one new extraction well is drilled, or an existing well is used, that is connected to the vacuum side of a blower. Additional small diameter monitoring wells are drilled at set distances (e.g., 15 feet and 45 feet) away from the extraction wells. The monitoring wells measure the radius of influence of the vacuum created and provide an estimate of future full-scale remediation well spacing. Sampling of vapor emissions from the well provide an estimate of the rate of VOC removal and what emission controls would be effective.

Typically it is found that the amount of VOCs removed is initially large but declines fairly rapidly.

Cost

The estimated capital and control cost for Alternative 3 is $706,000, including two years' operation. Annual O&M costs are estimated at $29,000 and would include long-term groundwater monitoring and reporting. Present worth costs are $1,152,000.

SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

The National Contingency Plan requires evaluation of alternatives based on nine criteria by which technical, economic, and practical factors associated with each remedial alternative must be judged. The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The nine evaluation criteria are summarized below.

Threshold Criteria must be satisfied in order for an alternative to be eligible for selection. The two threshold criteria are:

1) Overall Protection of Human Health and the Environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2) Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether a remedy will meet all of the ARARs of other Federal and State environmental laws and/or justifies a waiver.

Primary Balancing Criteria are used to weigh major tradeoffs amongst alternatives. These criteria are:

3) Reduction of Toxicity, Mobility, or Volume through Treatment is the anticipated performance of the treatment technologies a remedy may employ.

4) Short-term Effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

5) Long-term Effectiveness and Permanence refer to expected residual risk and the ability to a remedy to maintain reliable protection of human health and the environment over time, after cleanup goals have been met.

6) Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7) Cost includes estimated capital and O&M costs, also expressed as net present worth costs.

Modifying Criteria are usually taken into account after public comment is received on the Feasibility Study report and the Proposed Plan. These criteria are:

8) State/Support Agency Acceptance reflects aspects of the preferred alternative and other alternatives that the support agency favors or objects to, and any specific comments regarding State ARARs or the proposed use of waivers.

9) Community Acceptance summarizes the public's general response to the alternatives described in the Proposed Plan and in the Feasibility Study report based on public comments received.

The nine criteria are compared to each alternative in Tables 1, 2, and 3. The major conclusions of the comparisons are as follows:

SHALLOW SOIL ALTERNATIVES

Overall Protection: because the current and future health risk for shallow soil is so low as to be acceptable under USEPA and IEPA criteria for the projected site use scenario, the limited no action alternative offers adequate protection to human health and the environment. The other alternatives could provide additional protection through excavating or covering contaminated soil. The additional protection afforded by Alternatives 2, 3, and 4 is estimated to be negligible and appears not justifiable. In contrast, Alternatives 2, 3, and 4, in the short term, may provide a less protective option than Alternative 1 because they involve months of on-site construction activity and heavy traffic into and out of the site.

Compliance with ARARs: all alternatives can be implemented to be equally in compliance with ARARs.

Reduction in TMV (toxicity, mobility, volume): Alternative No. 2 will reduce toxicity, mobility, and volume. Alternative No. 4 will only reduce mobility. Toxicity and volume would not be reduced. Alternative No. 3 would reduce mobility, however toxicity would remain the same and volume would increase. Alternative No. 1 would not reduce toxicity, mobility, or volume. Although Alternative 1 does not provide a reduction in TMV, the advantage of a reduction of TMV in the shallow soil afforded by Alternatives 2, 3, and 4 may be considered negligible, given that the soil presents a low acceptable risk.

Short-term Protectiveness: Alternatives Nos. 2, 3 and 4 can all be implemented to mitigate potential public health risks. All work at the site would be conducted in accordance with an approved work plan. Short-term protectiveness is not applicable to Alternative No. 1.

Long-term Protectiveness: Alternative No. 2 would provide the most long-term protection since the majority of the contaminants would be removed. The dermal contact risk also would be reduced to acceptable levels since a clay or concrete cover would be provided. Alternative Nos. 3 and 4 would basically provide the same protection as long as long-term operation, maintenance and repairs are ensured. The Limited No Action Alternative No. 1 would provide long-term protection if deed and zoning restrictions are enforced. Institutional controls and deed/zoning restrictions would provide adequate long-term protection under the current proposed land use scenario.

Implementability: Alternative Nos. 1, 2, and 4 can all be implemented without any problems. Alternative No. 3 cannot be implemeted within a reasonable degree of certainty that contaminants would be reduced to acceptable levels. The technology, material, and labor are all available.

Cost: Alternative No. 1 is the least costly followed by Alternative No. 4, Alternative No. 3 and Alternative No 2. Please refer to Table 2 for detailed capital cost, operation and maintenance, and present worth.

Support Agency Acceptance: USEPA Region V, the designated support agency for this site, concurs with the Illinois Environmental Protection Agency's recommendation of Alternative No. 1 as the preferred remedy.

Community Acceptance: The public has been given the opportunity to review and comment on the Remedial Investigation report, the Feasibility Study report, and the Proposed Plan for this site. Both a public comment period and a formal public hearing were held. The community expressed interest in the proposed remedy at the public hearing with verbal questions and comments. Please refer to the responsiveness summary for details.

DEEP SOIL ALTERNATIVES

Overall Protection: Alternative No. 2 would provide the maximum protection since contaminants would be removed from the site. Alternative No. 3 would reduce the concentration of contaminants in the deep soil; however, VOCs would only partially be removed and residual VOCs as well as metals, cyanides and nonvolatile chemicals would remain. Also, effectiveness of Alternative 3 would significantly reduced based on impediments in the local geology (e.g., clay lens), soil moisture content, the NAPL, the sludge seam, potentially from the dry wells, and the presence of the unknown PCE source(s). Alternative 1 offers the least protection as the potential for migration of VOCs to groundwater is mitigated only by naturally occurring degradative processes such as biodegradation and hydrolysis.

Compliance with ARARs: Alternative No. 2 would meet all compliance ARARs. However, soils would require additional testing before the final disposal option can be fully determined. If contaminant levels exceed those allowed under the Land Disposal Regulation, the best available technology for reducing contaminant levels may be required. Alternative No. 3 would reduce VOC contamination in the deep soils, however, soil cleanup objectives may not be reached. Alternative No. 1 would not achieve cleanup levels.

Reduction in TMV (toxicity, mobility, volume): Alternative No. 2 would reduce toxicity, mobility, and volume by removal of the source of contamination. Alternative No. 3 would also reduce the TMV of the source; however, unacceptable levels of residual contamination could potentially remain. Alternative No. 1 would not provide any reduction of TMV.

Short-term Protectiveness: Alternative Nos. 2 and 3 do pose a potential risk; however, these risks may be mitigated with proper design and implementation of the alternative. Alternative No. 1 is not applicable.

Long-term Protectiveness: Alternative No. 2 provides the best long term protection since the excavated soil will be placed and managed under a permitted waste disposal facility. Alternative No. 3 would not provide limited long-term protection against future migration of VOCs, SVOCs and metals into the groundwater. The No Action Alternative No. 1 would not provide long-term protection.

Implementability: Alternative No. 1 would be the easiest remedy to implement since a monitoring program is proposed under this alternative. Alternative No. 2 can be easily implemented since waste disposal facilities are available. Alternative No. 3 cannot be readily implemented successfully.

Cost: Alternative No. 1 is the least expensive alternative, followed by Alternative No. 3 and finally Alternative No. 2. Please refer to Table 3 for detailed cost estimates.

Support Agency Acceptance: USEPA Region V, the designated support agency for this site, concurs with the Illinois Environmental Protection Agency's recommendation of Alternative No. 2 as the selected remedy for the deep soil operable unit.

Community Acceptance: This criteria is the same as the shallow soil alternative criteria.

THE SELECTED REMEDY

Based on consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, both IEPA and USEPA Region V have determined that Shallow Soil Alternative No. 1 and Deep Soil Alternative No. 2 are the best remedies for the soil operable units at the Parson's Casket Hardware Site.

Shallow Soil Alternative No. 1 consists of institutional controls and deed/zoning restrictions. This remedy includes physical access restriction via upgrade of the existing fence and/or installation of additional fencing, such as a six-foot high cyclone fence with barbed wire at the top, around the entire site. The fence will be posted with numerous visual warning signs at appropriate intervals and at other obvious access areas such as the three entrance gates to inform the public of potential site hazards.

The site's real estate deed will also be amended and local zoning ordinances will be imposed to maintain the site for industrial use. Prohibition of on-site groundwater use will be restricted. Construction on-site will include restrictions that require any excavated soils be properly disposed of in the accordance with the current state and federal regulations.

Deep Soil Alternative No. 2 consists of excavation and disposal of an isolated area of the remaining old lagoon and dry wells. These areas were not visible during the original remediation conducted by IEPA's immediate removal action. This deep soil contamination was discovered during the Remedial Investigation (RI) at the site. The soil will be excavated and disposed of at a land disposal facility permitted to accept the waste. It is expected that the remediation of the deep soil will affect the integrity of a watermain that is located at the site. Therefore, the line will be rerouted around the Parson's Casket Hardware Site. The proposed route is acceptable with the City of Belvidere.

The selected final remedies for this site are the same preferred alternatives presented in the Proposed Plan that were recently presented to the public. Details of the components of the remedy may be altered as a result of the remedial design, construction, long-term remedial action phases, and any modifications.

Statutory Determinations

The selected remedy must satisfy the requirements of Section 121 of CERCLA to protect human health and the environment; comply with ARARs; be cost effective; utilize permanent solutions and alternate treatment technologies to the maximum extent practicable; and satisfy the preference for treatment as a principle element of the remedy.

Protection of Human Health and the Environment

Implementation of the selected remedies will eliminate, reduce, and control potential risk to human health from exposure to contaminated groundwater and soils through institutional controls and treatment technologies. The remedy will reduce risk to within the acceptable range of 1 x 10-4 to 1 x 10-6 excess cancer risk and the hazard indices for noncarcinogens will be less than one. The selected remedy will also provide environmental protection from potential risks posed by contaminants discharging to groundwater, soils, and the ambient air.

No unacceptable short-term risk or cross-media impacts will be caused by implementation of the selected remedy.

Compliance with ARARs

With respect to any hazardous substances, pollutants, or contaminants that will remain on site, Section 121(2)(A) of CERCLA requires the USEPA to select a remedial action which complies with legally applicable or relevant and appropriate standards, requirements, criteria or limitations (ARARs). The selected remedy will comply with Federal ARARs or State ARARs where State ARARs are more stringent, as determined by USEPA. No ARAR waivers will be invoked. The remedy will be implemented in compliance with applicable provisions of CERCLA and the NCP.

Only the substantive requirements of ARARs apply to on-site activities. Federal program requirements which are implemented under a delegated State program are ARARs only to the extent they include requirements not incorporated into State regulations; the State regulations are the primary ARARs. Chemical-Specific ARARs: Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically define the extent of cleanup at a site.

! Safe Drinking Water Act (SDWA) National Primary Drinking Water Standards (40 CFR 141), MCLs are applicable; proposed MCLs are to be considered.

! Safe Drinking Water Act (SDWA) National Primary Drinking Water Standards (40 CFR 143) non-zero MCLGs and non-zero proposed MCLGs are applicable or relevant and appropriate.

! Federal Water Pollution Control Act (also known as the Clean Water Act--CWA) (40 CFR 122, 125, 129, 131), ambient water quality criteria and NPDES program in water runoff, and groundwater; delegated NPDES program in Illinois is implemented at 35 Illinois Administrative Code 302, 304, and 309.

! Identification and Listing of Hazardous Waste (40 CFR Part 261.4), waste must be characterized by TCLP testing during remedial design/remedial action to determine regulatory classification. This requirement is applicable if the waste is determined to be characteristically hazardous. This requirement would be relevant and appropriate if the waste are similar to listed or characteristically hazardous waste.

! Releases from Solid Waste Management Units (40 CFR Part 264 Subpart F), This requirement is applicable to releases of contaminants. Concentrations are identical to MCLs.

! Illinois Groundwater Quality Standards (35 Illinois Administrative Code-- IAC 620.410) are applicable for groundwater standards.

Location-Specific ARARs: Location-specific ARARs are those requirements that relate to the geographic location of site.

! None identified.

Action-Specific ARARs: Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

! National Primary and Secondary Ambient Air Quality (40 CFR Part 50), This requirement is applicable for alternatives emitting regulated pollutants.

! Resource Conservation and Recovery Act (RCRA) (40 CFR 261) is applicable for definition and identification of hazardous wastes; delegated program in Illinois is implemented at 35 Illinois Administrative Code 721.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 262) is applicable for generators of hazardous wastes if materials are disposed off site. This requirement is relevant and appropriate for waste not characterized as hazardous, because, at a minimum, the waste is being considered a special waste. The delegated program in Illinois is implemented at 35 Illinois Administrative Code 722.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 264 Subpart B) is applicable for general facility standards; delegated program in Illinois is implemented at 35 Illinois Administrative Code 724 Subpart B.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 264 Subpart D) is applicable for contingency planning; delegated program in Illinois is implemented at 35 Illinois Administrative Code 724 Subpart B.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 264 Subpart F), is applicable for groundwater monitoring; delegated program in Illinois is implemented at Illinois Administrative Code 724 Subpart F.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 264 Subpart G), This requirement is applicable. This requirement is also relevant and appropriate since contaminants will be left in place; delegated program in Illinois is implemented at 35 Illinois Administrative Code 724 and 725. 35 Illinois Administrative Code 811 and 807 are relevant and appropriate for closure and post-closure requirements, because, at a minimum, the waste is being considered a special waste.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 264 Subpart I), This requirement would be applicable is the waste is determined to be characteristically hazardous. The requirement is also relevant and appropriate because waste will be considered, at a minimum, a special waste.

- Resource Conservation and Recovery Act (RCRA) (40 CFR 264 Subpart K), this requirement is relevant and appropriate because the alternative involves the removal of a former lagoon impoundment; delegated program in Illinois is implemented at 35 Illinois Administrative Code 728.

- Resource Conservation and Recovery Act (RCRA) (40 CFR Part 268), This requirement is applicable for land disposal restrictions relative to disposal of waste from the site.

- Illinois Groundwater Quality Standards (35 Illinois Administrative Cod 620 Subpart E) are applicable for groundwater monitoring.

- Illinois Solid Waste and Special Waste Handling Regulations (35 Illinois Administrative Code 808 and 35 Illinois Administrative Code 809) are applicable for off site special waste hauling.

- Illinois Water Well Construction Code (77 Illinois Administrative Code 920) is applicable for the construction and abandonment of monitoring wells.

To Be Considered (TBCs) are included in the discussion of ARARs: however, TBCs are not ARARs, but they may be used to design a remedy or set cleanup levels in no ARARs address the site, or existing ARARs do not ensure protectiveness. TBCs may include advisories and guidance.

Cost Effectiveness

Cost effectiveness is determined by evaluating the overall effectiveness proportionate to costs, such that the selected remedy represents a reasonable value for the money to be spent. The estimated net present worth value of the selected remedy for the shallow soil Alternative #1 is the 10 times less expensive than the next highest Alternative. Alternative #2 for the deep soils is the most expensive alternative, yet the selected remedy will be the alternative most effective in the long term due to a significant reduction in the mobility, toxicity, and volume of on-site contamination. Alternative #2 provides a high degree of certainty that hazards posed by contamination at the site will eliminate or reduced to within acceptable levels. Therefore, it was determined that the additional costs were acceptable.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedies meet the statutory requirement to utilize permanent solutions and treatment technologies to the maximum extent practicable in a cost-effective manner. Of those alternatives that are protective of human health and the environment and comply with ARARs, IEPA and USEPA have determined that the selected remedies provide the best balance of tradeoffs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through excavation and removal; short term effectiveness; implementability; and cost while considering the statutory preference for treatment

Preference for Treatment as a Principal Element

The risk associated with the shallow soil operable unit did not warrant treatment is taken for property which has been, and will be, utilized in an industrial setting.

The selected remedy for the deep soil operable unit addresses a principal threat posed by the site through excavation and removal to reduce contaminant levels to within an acceptable range. All treatment technologies were evaluated and ultimately repudiated based on site specific conditions, which were unsuitable for any of the technologies to be utilized at the site. Therefore, it was determined by the Illinois EPA and USEPA that excavation and removal was the best technology too adequately remediate the site for protection of human health and the environment.

Documentation of Significant Changes

The Proposed Plan for the Parson's Casket Hardware Superfund site was issued for public comment on July 17, 1996. The Proposed Plan identified Alternative #1 and Alternative #2 as the preferred alternative for the shallow soil and deep soil operable units, respectively. The public comment period ended August 15, 1996.

The Agency reviewed all public questions and comments presented at the August 7, 1996 public hearing and all written comments received during the public comment period (see Responsiveness Summary). Illinois EPA and USEPA determined that no significant changes to the remedies selected, as identified in the Proposed Plan, are necessary.

Chemical Specific Federal and State ARARs

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate*	Comments
Identification and Listing of Hazardous Waste	40 CFR Part 261.4	Defines those solid wastes which are subject to regulation as hazardous wastes.	Yes/Yes	If wastes are listed or characteristic wastes, then SWDA requirements are applicable. If wastes are similar to listed or characteristic wastes, the SWDA requirements would be relevant and appropriate.
Releases from Solid Waste Management Units	40 CFR Part 264 Subpart F	Establishes maximum contaminant concentrations that can be released from hazardous waste units in Part 264, Subpart F.	Yes	The maximum contaminant concentrations that can be released are identical to the MCLs.
Safe Drinking Water Act	40 U.S.C. 300	Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) - Enforceable standards establishing maximum permissible levels of contaminants in drinking water from a public water system	Yes	Pertains to drinking water standards
National Primary Drinking Water Standards	40 C.F.R. Part 141	Establishes health-based standards for public water systems (maximum contaminant levels)	Yes	Federally enforceable drinking water standards
Clean Water Act	40 C.F.R. 122, 125, 129, 131	Provides federal, state and local discharge for the control of discharges of pollutants to navigable waters	Yes	Applicable to the waters of Illinois
Groundwater Quality	Title 35, Env. Prot. Act, Subtitle F, Public Water Supplies IAC 620.105-620.615	Part 620 describes various aspects of groundwater quality, including method of classification of groundwater, nondegradation provisions and various procedures and protocols for the management and protection of groundwaters. Groundwater quality standards are defined.	Yes	Groundwater Quality

Action-Specific Federal ARARs
the following discussion applies only to on-site activities

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate*	Comments
Releases from Solid Waste Management Units	40 CFR Part 264, Subpart F		Yes/Yes	Applicable if hazardous waste remains on-site. This Subpart establishes standards for groundwater monitoring and procedures for corrective action if releases do occur. If waste is completely treated or removed, regulations are relevant and appropriate only because on-site releases are not anticipated.
Closure and Post-Closure	Subpart G		Yes/Yes	Establishes requirements for site closures (if closure is in question) including placement and maintenance of a cap.
Use and Management of Containers	Subpart I		Yes/Yes	Applicable if the alternative involves storage of hazardous materials in containers. Is still relevant and appropriate because the waste will be considered, at a minimum, a special waste.
Surface Impoundments	Subpart K		No/Yes	Alternative involves the removal of a former surface impoundment
Land Disposal	40 CFR Part 268	Establishes a timetable for restriction of land disposal of wastes and other hazardous materials.	Yes	Applicable if an alternative involves off-site or on-site disposal of contaminated soils. However, for on-site disposal actions, based upon the criteria set forth in the Federal Register dated February 16, 1993, a Correction Action Management Unit may be designated by USEPA, which could utilize somewhat less restrictive requirements than the land disposal regulations and the minimum technology requirements.
National Primary and Secondary Ambient Air Quality	40 CFR Part 50	Establishes National Ambient Air Quality Standards (NAAQS) for ambient air to protect public health and welfare.	Yes	Primary standards applicable for any alternative emitting regulated pollutants.

Action-Specific Federal and State ARARs
the following discussion applies only to on-site activities

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate*	Comments
Standards Applicable to Generators of Hazardous Waste	40 CFR 262	Establishes standards for generators of hazardous waste in general.	Yes	These regulation are all applicable once a medium is identified as "hazardous".
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR 264	Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste.	Yes/Yes	These requirements are applicable or relevant and appropriate depending on the nature of the wastes, or the type of activity (i.e., treatment, storage, or disposal) proposed.
Hazardous Waste Management	Title 35 Env. Prot. Act Subtitle G: Waste Disposal 35 IAC 724.101-.451,	Mgt. of hazardous waste in relation to RCRA. State of Illinois rules generally parallel Fed. EPA rules.	No/Yes	May not be applicable to NPL, CERCLA, but are relevant and appropriate dependent upon technology and design of RA. The State of IL should determine status of RCRA/CERCLA interface during screening of Remedial Technology.
Generator Requirements	35 IAC 722	Requirements for generators of hazardous waste	Yes	If excavated soils are determined to be characteristically hazardous, then this requirement is applicable
Landfill Closure and Post-Closure Requirements	Title 35 Env. Prot. Act, Subpart G 35 IAC 724.211.219	Closure and Post-Closure Requirements for Landfills	No/Yes	This requirement is relevant and appropriate.
Treatment of Waste in Tanks	35 IAC 724, Subpart J	Specifies requirements for treatment of waste in tanks.	Yes	Applicable where soils stabilization is proposed ex-situ.
Placement of Waste in Piles	35 IAC 724, Subpart L	Specifies requirements for management of waste piles	Yes/Yes	Applicable to RA where excavated soils are determined to be characteristically hazardous and placed in waste piles prior to treatment. Relevant and appropriate because, at a minimum, the excavated soils will be considered a special waste.
Special Waste Hauling	Title 35 Env. Prot. Act Subtitle G. Waste Disposal 35 IAC 809.101-.802	Applies to all hauling of special wastes - (also review IDOT requirements).	Yes	Applicable because, at a minimum, the excavated material is being considered a special waste.
Land Disposal	35 IAC 728	Specifies which wastes may not	Yes	Where excavated soils are

Restrictions		be disposed of on land.		determined to be characteristically hazardous, this requirement is applicable.

Location-Specific Federal ARARs

Standard, Requirement Criteria or Limitation	Citation	Description	Applicable/ Relevant and Appropriate*	Comments
National Historic Preservation Act	16 USC 470 40 CFR 6.301(b) 36 CFR Part 800	Requires federal agencies to take into account the effect of any federally-assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for the inclusion in the National Register of Historic Places.	No/No	The remedy does not affect any district, site, building, structure, or object listed or eligible for the National Register.
Archaeological and Historic Preservation Act	16 USC 469 40 CFR 6301	Establishes procedures to provide for preservation of historical and archaeological data which might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	No/No	The remedy does not affect historical or archaeological data.
Historic Sites, Buildings, and Antiquities Act	15 USC 461-467 40 CFR 6.301(a)	Requires federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks.	No/No	The remedy does not affect any Natural Landmark.
Fish and Wildlife Coordination Act	16 USC 661-666	Requires consultation when federal department or agency proposes or authorizes any stream or other water body and adequate provision for protection of fish and wildlife resources.	No/No	It is unlikely that the alternatives will involve any modifications of nearby streams.
Endangered Species Act	16 USC 1531 50 CFR Part 200 50 CFR Part 402	Requires action to conserve endangered species within critical habitats upon which endangered species depend, includes consultation with Department of Interior	No/No	No endangered species were found on the site.
Clean Water Act	33 USC 1251-1376	Provides federal, state and local discharge for the control of discharges of pollutants to navigable waters.	Yes	Applicable to the waters of Illinois.

Location-Specific Federal ARARs

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate*	Comments
Dredge or Fill Requirements (Section 404)	40 CFR Parts 230, 231	Requires permits for discharge of dredged or fill material into navigable water.	No/No	There will be no discharge of dredged or fill material into navigable waters as part of the remediation.
Rivers and Harbors Act of 1899	33 USC 403	Gives authority to states over rivers and harbors	No/No	No rivers or harbors are potential receptors.
Section 10 Permit	33 CFR Parts 320-330	Requires permit for structures or work in or affecting navigable waters	No/No	The remedy does not involve construction in or affecting navigable waters.
Executive Order on Protection of Wetlands	Exec. Order No. 11,990 40 CFR 6.0302(a) and Appendix A	Requires federal agencies to avoid to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practical alternative exists.	No/No	No alternative involves any modifications or loss of wetlands.
Executive Order on Floodplain Management	Exec. Order No. 11,988	Requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid the adverse impacts associated with direct and indirect development of a floodplain.	No/No	This site is not within a 100-year floodplain.
Wilderness Act	16 USC 1131 50 CFR 35.1	Administer federally-owned wilderness area to ensure it is left unimpacted.	No/No	There are no wilderness areas on-site or adjacent to the site.
National Wildlife Refuge System	16USC 668 50 CFR Part 27	Restricts activities within a National Wildlife Refuge	No/No	There are no wildlife refuges on-site or adjacent to the site.
Scenic River Act	16 USC 1271 40 CFR 6.302(e)	Prohibits adverse effects on scenic rivers.	No/No	No scenic rivers in the area.
Coastal Zone Management Act	16 USC 1451	Conduct activities in accordance with state-approved management program.	No/No	Area is not a coastal zone.

Location-Specific State ARARs

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate*	Comments
Public Hearing Advertisement and Timing Requirements	Title 35, Env. Prot. Act Subtitle A. Gen. Prov. Part 166, Procedures for Public Hearings. 166.120, 35 IAC Part 166.130, 166.191, 35 IAC Part 725	Notice shall be published once weekly for 3 consecutive weeks, with the first notice given at least 45 days prior to the date of the hearing. The hearing in the State of II shall be presided over by the "Hearing Officer" on State Lean NPL Projects. A verbatim record, transcript of the legal proceedings will be taken. The hearing record shall be closed 30 days after the date of the hearing. A responsiveness summary shall be prepared by IEPA.	Yes	No permits are required for on-site activities under CERCLA. But, requirements for public hearings are applicable.
Public Hearing Requirements	35 IAC 168 35 IAC 168 35 IAC 166 35 IAC 166 35 IAC 166	Air Permit Requirements Wastewater Permit Requirements RCRA Permits NPDES Permit Hearings Sanitary Landfill and Closure Plan Informational Hearing	Yes	No permits are required for on-site activities under CERCLA. But requirements for public hearings will be applicable.
Facility Siting Information	35 IAC 703.184	Defines information required on location with respect to geology	No/No	This is not an ARAR as it is entirely administrative.
Seismic Standards	35 IAC 724.118	Specifies seismic requirements for construction of hazardous waste facilities	No/Yes	This requirement is relevant and appropriate.
Facility Location	35 IAC 811.102, .302	Describes location requirements and restrictions for siting hazardous waste facilities	No/Yes	This requirement is relevant and appropriate.

*-Once the question "Is this regulation applicable?" is answered "Yes," the question "Is this regulation relevant and appropriate?" does not apply. However, the waste at Parson's will be characterized for classification as hazardous or not hazardous during the remedial design/remedial action (RD/RA) phase. Therefore, in some ARAR evaluations the criteria will be applicable if the waste is determined to be hazardous. If the waste is determined not to be hazardous, the criteria would still be relevant and appropriate, thus the "Yes/Yes" designation.

To Be Considered (TBCs)

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate#	Comments
1-Day Health Advisory	USEPA Office of Drinking Water	Nonenforceable concentrations of drinking water contaminants that are not expected to cause noncarcinogenic adverse health effects over a 1-day exposure duration.	TBC	The advisory is protective for a 10-kg child; therefore, also protective for adults.
10-Day Health Advisory	USEPA Office of Drinking Water	Nonenforceable concentrations of drinking water contaminants that are not expected to cause noncarcinogenic adverse health effects over a 10-day exposure duration.	TBC	The advisory level is protective for a 10-kg child; therefore, also protective for adults.
Long-Term Health Advisory	USEPA Office of Drinking Water	Nonenforceable concentrations of drinking water contaminants that are not expected to cause noncarcinogenic adverse health effects over a 7-year (or 10% of an individual lifetime) exposure duration.	TBC	The longer term advisory level is for a 10-kg child. Additional advisory levels are available for a 70-kg adult.
Lifetime Health Advisory	USEPA Office of Drinking Water	Nonenforceable concentrations of drinking water contaminants that are not expected to cause noncarcinogenic adverse health effects over a lifetime exposure.	TBC	Lifetime health advisories are not recommended for any of the chemicals classified as known or probable human carcinogens; and for certain chemicals classified as possible human carcinogens.

- To Be Considered (TBCs) criteria are included, however, TBCs are not ARARs, but they may be used to design a remedy or set cleanup levels if no ARARs address the site, or if existing ARARs do not ensure protectiveness. TBCs may include advisories or guidance.

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TABLE 1-1
SUMMARY OF CONTAMINANTS FOUND IN SURFACE SOILS
AT PARSON'S CASKET HARDWARE SITE, BELVIDERE, ILLINOIS

Chemical	Mean Concentration in Surface Soils (mg/Kg)	Maximum Concentration in Surface Soils (mg/Kg)
INORGANICS		
Antimony	4.8	13.7
Arsenic	6.1	11.9
Barium	102	240
Beryllium	0.5	1.2
Cadmium	1.7	7.1
Chromium	24	139
Cobalt	6.9	11.3
Copper	1125	12700
Lead	106	319
Manganese	488	1030
Nickel	160	985
Selenium		
Silver	8.5	39.9
Vanadium	26	108
Zinc	748	6310
Cyanide	6.7	26.5
ORGANICS		
Acetone	0.01	0.01
Acenaphthene	0.07	0.08
Acenaphthylene	0.12	0.12
Anthracene	0.20	0.43
Benzene	0.0008	0.0009
Benzo(A)anthracene	0.64	2.25
Benzo(b)fluoranthene	0.76	2.55
Benzo(k)fluoranthene	0.42	1.05
Benzo(g,h,i)perylene	0.48	1.40
Benzo(a)pyrene	0.59	1.95
Bis(2-ethylhexyl)phthalate	0.68	1.20
Chloroform	0.003	0.003
Chrysene	0.68	2.50
Dibenzo(a,h)anthracene	0.22	0.44
Dibenzofuran	0.11	0.13
Di-n-butyl phthalate	0.29	0.99
Fluoranthene	0.86	2.50
Fluorene	0.11	0.12
Indeno(1,2,3-cd)pyrene	0.52	1.40
Methylene Chloride	0.029	0.056
2-Methylnaphthalene	0.26	0.59
Naphthalene	0.18	0.26
Phenanthrene	0.64	1.60
Pyrene	0.99	3.00
Tetrachloroethylene		
Toluene		
1,1,1-Trichloroethane	0.003	0.004
Trichloroethylene	0.003	0.003

TABLE 1-2
SUMMARY OF CONTAMINANTS IN BACKGROUND SOILS
AT PARSON'S CASKET HARDWARE SITE, BELVIDERE, ILLINOIS

Chemical	Mean Concentration in Surface Soils (mg/Kg)	Maximum Concentration in Surface Soils (mg/Kg)
INORGANICS		
Antimony		
Arsenic	6	6.9
Barium	136	185
Beryllium	0.5	0.8
Cadmium	0.4	0.4
Chromium	13	16.8
Cobalt	9	12.6
Copper	33	37.4
Lead	98	104
Manganese	1282	1370
Nickel	24	25.8
Selenium		
Silver	0.5	0.8
Vanadium	26	32.5
Zinc	156	168
Cyanide	0.6	0.7
ORGANICS		
Acetone		
Acenaphthene	0.058	0.06
Acenaphthylene	0.03	0.05
Anthracene	0.16	0.19
Benzene		
Benzo(A)anthracene	0.28	0.41
Benzo(b)fluoranthene	0.53	0.55
Benzo(k)fluoranthene	0.27	0.49
Benzo(g,h,i)perylene	0.18	0.3
Benzo(a)pyrene	0.47	0.49
Bis(2-ethylhexyl)phthalate	3.85	5.7
Chloroform		
Chrysene	0.32	0.52
Dibenzo(a,h)anthracene	0.05	0.05
Dibenzofuran	0.03	0.03
Di-n-butyl phthalate	0.31	0.38
Fluoranthene	1.12	1.2
Fluorene	0.05	0.09
Indeno(1,2,3-cd)pyrene	0.30	0.31
Methylene Chloride	0.002	0.006
2-Methylnaphthalene	0.18	0.22
Naphthalene	0.21	0.22
Phenanthrene	0.67	0.77
Pyrene	1.08	1.10
Tetrachloroethylene		
Toluene	0.008	0.015
1,1,1-Trichloroethane		
Trichloroethylene		

TABLE 1-3
SUMMARY OF CONTAMINANTS FOUND IN DEEP SOILS
AT PARSON'S CASKET HARDWARE SITE, BELVIDERE, ILLINOIS

Chemical	Mean Concentration in Deep Soils (mg/kg)	Maximum Concentration in Deep Soils (mg/kg)
INORGANICS [mg/kg]		
Aluminum	5540.32	15300.00
Antimony	6.71	24.20
Arsenic	4.74	28.30
Barium	59.68	190.00
Beryllium	0.45	1.40
Cadmium	2.92	8.40
Calcium	52851.00	157000.00
Chromium	13.49	139.00
Cobalt	5.36	11.70
Copper	154.57	2750.00
Iron	11831.45	38400.00
Lead	37.28	425.00
Magnesium	27461.73	99200.00
Manganese	363.52	1020.00
Mercury	0.53	0.70
Nickel	144.37	4740.00
Potassium	568.57	1520.00
Selenium	1.17	4.00
Silver	15.26	155.00
Sodium	242.11	1680.00
Thallium	1.29	27.60
Vanadium	16.39	36.90
Zinc	158.91	1580.00
Cyanide	21.36	467.00
ORGANICS [µg/kg]	Note units below in ug/kg	
Acenaphthene	127.33	280.00
Acenaphthylene	116.67	120.00
Anthracene	315.40	480.00
Benzo(a)anthracene	632.21	2300.00
Benzo(b)fluoranthene	785.47	3100.00
Benzo(k)fluoranthene	354.50	1100.00
Benzo(a)pyrene	730.80	2000.00
Benzo(g,h,i)perylene	540.38	1200.00
Bis(2-ethylhexyl)phthalate	340.55	1700.00
Carbazole	170.40	340.00
Chrysene	637.13	2700.00
Dibenzo(a,h)anthracene	321.25	450.00
Dibenzofuran	88.83	210.00

TABLE 1-3 (CONTINUED)
SUMMARY OF CONTAMINANTS FOUND IN DEEP SOILS
AT PARSON'S CASKET HARDWARE SITE, BELVIDERE, ILLINOIS

Chemical	Mean Concentration in Deep Soils (ug/kg)	Maximum Concentration in Deep Soils (ug/kg)
ORGANICS [ug/kg] (Cont'd)		
1,2-Dichloroethene	4.00	4.00
Diethylphthalate	90.50	380.00
Di-n-butyphthalate	588.39	6387.00
Di-n-octylphthalate	65.07	130.00
Fluoranthene	699.47	2600.00
Fluorene	134.20	260.00
Ideno(1,2,3-cd)pyrene	619.50	1400.00
Methylene Chloride	98.00	140.00
2-Methylnaphthalene	239.89	600.00
Naphthalene	362.80	2500.00
N-Nitrosodiphenylamine(1)	2900.00	2900.00
Pentachlorophenol	1459.00	4200.00
Phenanthrene	685.75	3000.00
Phenol	120.00	120.00
Pyrene	958.05	4800.00
1,1,1-Trichloroethane	5.00	6.00
Trichloroethene	30.20	120.00
Toluene	2.00	2.00

TABLE 1-4
SUMMARY OF CONTAMINANTS FOUND IN THE GROUNDWATER
AT PARSON'S CASKET HARDWARE SITE, BELVIDERE, ILLINOIS

Chemical	Mean Concentration (ug/L)	Maximum Concentration (ug/L)
ORGANICS		
1,1-Dichloroethane	27	500
1,1-Dichloroethylene	10	64
1,2-t-Dichloroethylene	225	4900
1,2-Dichloroethane	2.5	3
Tetrachloroethylene	39	250
1,1,1-Trichloroethane	169	1900
Trichloroethylene	254	1350
INORGANICS		
Arsenic	3	38
Barium	73	107
Chromium	6	24
Cobalt	4	13.2
Copper	48	666
Lead	13	61
Manganese	203	2060
Nickel	60	736
Selenium	3	17
Zinc	19	152

Table 1-5. Summary of Carcinogenic and Noncarcinogenic Risks Associated with Exposure to Site and Background Shallow Soil Under Current and Future Land Use Scenarios. (Page 1 of 4)

Current Receptor: Site Worker

	Carcinogenic Risk3		Noncarcinogenic Risk4	
	Site Shallow Soil	Background Shallow Soil	Site Shallow Soil	Background Shallow Soil
Risks Associated with Exposure to CTE1 Concentrations	1 x 10-6	1 x 10-6	<1	<1
Risks Associated with Exposure to RME2 Concentrations	5 x 10-6	7 x 10-6	<1	<1
Risk Driver: Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	N/A	N/A
Risk Driver: Compound(s)	1) Arsenic 1) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	N/A	N/A
Current Receptor: Adult Trespasser				
Risks Associated with Exposure to CTE1 Concentrations	2 x 10-7	1 x 10-7	<1	<1
Risks Associated with Exposure to RME2 Concentrations	8 x 10-6	8 x 10-6	<1	<1
Risk Driver Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	N/A	N/A
Risk Driver: Compound(s)	1) Arsenic 2) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	N/A	N/A

Table 1-5. Summary of Carcinogenic and Noncarcinogenic Risks Associated with Exposure to Site and Background Shallow Soil Under Current and Future Land Use Scenarios. (Page 2 of 4)

	Carcinogenic Risk[3]		Noncarcinogenic Risk[4] Hazard Quotient	
	Site Shallow Soil	Background Shallow Soil	Site Shallow Soil	Background Shallow Soil
Future Receptor: Adult Resident				
Risks Associated with Exposure to CTE[1] Concentrations	3×10^{-6}	3×10^{-6}	<1	<1
Risks Associated with Exposure to RME[2] Concentrations	3×10^{-5}	3×10^{-5}	3.8	3.3
Risk Driver: Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	Ingestion	Ingestion
Risk Driver: Compound(s)	1) Arsenic 1) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	Manganese	Manganese
Future Receptor: Child Resident				
Risks Associated with Exposure to CTE[1] Concentrations	3×10^{-6}	3×10^{-6}	<1	1
Risks Associated with Exposure to RME[2] Concentrations	3×10^{-5}	3×10^{-5}	3.9	4.4
Risk Driver Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	Ingestion	Ingestion
Risk Driver: Compound(s)	1) Arsenic 2) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	Manganese Silver	Manganese

Table 1-5. Summary of Carcinogenic and Noncarcinogenic Risks Associated with Exposure to Site and Background Shallow Soil Under Current and Future Land Use Scenarios. (Page 3 of 4)

	Carcinogenic Risk[3]		Noncarcinogenic Risk[4] Hazard Quotient	
	Site Shallow Soil	Background Shallow Soil	Site Shallow Soil	Background Shallow Soil
Current Receptor: Site Worker				
Risks Associated with Exposure to CTE[1] Concentrations	1×10^{-6}	1×10^{-6}	<1	<1
Risks Associated with Exposure to RME[2] Concentrations	5×10^{-6}	7×10^{-6}	<1	<1
Risk Driver: Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	N/A	N/A
Risk Driver: Compound(s)	1) Arsenic 1) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	N/A	N/A
Future Receptor: Construction Worker				
Risks Associated with Exposure to CTE[1] Concentrations	2×10^{-7}	6×10^{-7}	<1	<1
Risks Associated with Exposure to RME[2] Concentrations	2×10^{-6}	1×10^{-6}	1.4	1.3
Risk Driver Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	Ingestion	Ingestion
Risk Driver: Compound(s)	1) Arsenic 2) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	Manganese Silver	Manganese

Table 1-5. Summary of Carcinogenic and Noncarcinogenic Risks Associated with Exposure to Site and Background Shallow Soil Under Current and Future Land Use Scenarios.

Future Receptor: Adult Trespasser

	Carcinogenic Risk[1]		Noncarcinogenic Risk[4] Hazard Quotient	
	Site Shallow Soil	Background Shallow Soil	Site Shallow Soil	Background Shallow Soil
Risks Associated with Exposure to CTE[1] Concentrations	1 x 10-7	1 x 10-7	<1	<1
Risks Associated with Exposure to RME[2] Concentrations	8 x 10-6	8 x 10-6	<1	<1
Risk Driver: Exposure Pathway(s)	1) Ingestion 2) Dermal	1) Ingestion 2) Dermal	N/A	N/A
Risk Driver: Compound(s)	1) Arsenic 1) Benzo(a)pyrene	1) Arsenic 1) Benzo(a)pyrene	N/A	N/A

Footnotes:
1. CTE = Central Tendency Exposure
2. RME = Reasonable Maximum Exposure
3. An excess carcinogenic risk less than 10-6 is considered acceptable.
4. A Hazard Quotient greater than 1.0 indicates a potential adverse health effect.

N/A = Not Applicable

ADMINISTRATIVE RECORD INDEX FOR THE PARSON'S CASKET HARDWARE SITE

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires the establishment of an Administrative record (AR) upon which the President shall base the selection of a response action (SARA;Sec. 113 (K) (1).

The Illinois Environmental Protection Agency (IEPA) in conjunction with the U.S. Environmental Protection Agency has compiled the following official Administrative Record Index for the Parson's Casket Hardware NPL site located in Boone County, Illinois. This index with associated actual file will be updated by the IEPA.

Please refer to information provided in the enclosed IEPA fact sheet on who and where to direct questions concerning this index.

NO.	DOCUMENT TITLE	ISSUE DATE	AUTHOR	NO. PAGES
1.	Fact Sheet	10/84	M Orloff	3
2.	Areal Photo Analysis	10/84	Envir. Monitoring	31
3.	HRS scoring and documentation	04/11/85	T Groutage K.M. Roberson	90
4.	HRS scoring and documentation	08/18/85	J Geiger	101
5.	Letter/Legal	12/14/87	M Gade	4
6.	Project Outline & Proposal Report	02/22/89	SAIC	203
7.	Work Plan Phase I	02/89	IEPA	416
8.	Letter/QAPP	03/02/89	K Yeates	4
9.	Letter/Work Plan	03/07/89	K Yeates	3
10.	Letter/H&SP	04/04/89	K Miller	5
11.	Letter/Technical	08/16/89	K Miller	1
12.	Plat/Parson's Casket	09/25/89	R Cowles	21
13.	Tech Memo letter	03/12/90	D Van Winkle	10
14.	Technical Memorandum No's 1.2.3.4.5.	03/90	SAIC	300
15.	USEPA approval on Work Plan	06/18/90	K. Yeates	8
16.	RI/FS Phase II Work Plan	08/90	SAIC	80
17.	RI/FS Phase II QAPP	08/90	SAIC	187
18.	Forms for Phase II Work Plan	11/02/90	K Yeates	114
19.	SAS Revisions	11/21/90	C Tsai	70
20.	IEPA Letter/QAPP	05/16/91	S Baer	5
21.	QAAP Guidance	06/21/91	USEPA	94
22.	IEPA letter containing (USEPA Guidance)	07/05/91	S Baer	8
23.	Ecological Risk Assessment Guidance	08/23/91	S Baer	6
24.	Project Schedule	09/05/91	S Baer	11
25.	Hydrogeologic Testing	09/06/91	Dr Vanderpool	91
26.	Radar Borehole Test Results	10/29/91	Borje Niva	10
27.	USEPA Guidance	11/06/91	T Hyde	2
28.	Revised schedule	04/01/92	S Miller	4

29.	USEPA approval of Schedule	05/15/92	J Oaks	1
30.	Municipal well data	08/19/92	S Miller	261
31.	USGS report	12/92	P Mills	40
32.	Final Remedial Investigation (RI) Report	12/21/92	SAIC	
	Vol. I (Chapters 1-7)			647
	Vol. II (Appendices A, B, C)			271
	Vol. III (Appendices D,E)			136
	Vol. IV (Appendix F)			265
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	Vol. VIII (Appendix G.4)			517
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	Vol. X (Appendix G.6)			254
	Vol. XI (Appendix G.7)			227
33.	Technical letter/RI	12/22/92	T Ayers	1
34.	USEPA approval of RI	01/04/93	J Oaks	1
35.	Revised schedule	01/25/93	S Miller	4
36.	USGS results	02/02/93	P Mills	32
37.	Memorandum/Technical	03/02/94	K Keller	
38.	Memorandum/Technical	03/09/94	E Runkel	
39.	Letter/Technical	11/29/95	D Heaton	
40.	USEPA approval of Proposed Plan	07/02/96	R Karl	
41.	Proposed Plan	07/02/96	IEPA	
42.	Soil Operable Unit Feasibility Study	07/09/96	SAIC	

Guidance Documents Consulted on Parson's Casket Hardware Site
Remedy Selection

Guidance for Conducting Remedial Investigations and Feasibility Studies 10/1/88, Pages (390) OSWER #9355-3.01

RI/FS Improvements Date: 7/23/87, Pages (11) OSWER #9355 0-20

RI/FS Improvements Follow-up, Date: 4/25/88, Pages (16), OSWER #9355.3-05

Superfund Federal-lead Remedial Management Handbook, Date: 12/1/86, Pages (179, OSWER #9355.1-1

Superfund Remedial Design and Remedial Action Guidance, Date: 6/1/86, Pages (100), OSWER #9355.0-4a

Superfund State-lead Remedial Project Management Handbook, Date: 12/1/86, Pages (120), OSWER #9355.2-1

RI/FS - Daily Quality/site & Waste Assessment

Compendium of Superfund Field Operations Methods, Date: 12/1/87, Pages (550), OSWER #9355.0-14

Data Quality Objectives for Remedial Response Activities:, Date: 3/1/87, Pages (150), OSWER #9355.0-7b

Data Quality Objectives for Remedial Response Activities: Example Scenario: RI/FS Activities at a Site W/contaminated Soils and Groundwater, Date: 3/1/87, Pages (120), OSWER #9355.0-7b

Field Screening for Organic Contaminants in Samples from Hazardous Waste Sites, Dates 4/2/86, Pages (11)

Field Screening Methods Catalog: User's Guide, Date 9/1/88, Pages (90),

Field Standard Operating Procedures Manual #6 Work Zones, Date 4/1/85, Pages (19), OSWER 9285.2.04

Field Standard Operating Procedures Manual #9 Site Safety Plan, Date: 4/1/85, Pages (26), OSWER #9285.2.05

Laboratory Data Validation Functional Guidelines for Evaluating

Inorganics Analyses, Date 7/1/88, Pages (20)

Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, Date 2/1/88, Pages (45)

Practical Guide for Ground-water Sampling, Date: 9/1/85, Pages (175), Epa/600/2-85/104

Soil Sampling Quality Assurance User's Guide, Date: 5/1/84, Pages 104, Epa 600/4-84/043

RI/FS Land Disposal Facility Technology

Covers for Uncontrolled Hazardous Wastes Sites, Dates: 9/1/85, Pages (475), Epa/540/2-85/002

Design, Construction, and Evaluation of Clay Liners for Waste Management Facilities, Date: 11/1/88, Pages (500), Epa/530/sw- 86/007ff

Evaluating Cover Systems for Solid and Hazardous Waste, 9/1/82, Pages (58), OSWER #9476.00-1

Land Disposal Restrictions, Date: 8/11/87, Page (23)

A Compendium of Technologies Used in the Treatment of Hazardous Wastes, Date 9/1/87, Pages (49), Epa/625/8-87/014

Carbon Adsorption Isotherms for Toxics Organics, Date: 4/1/80, Pages (321), Epa/6008-80-023

Handbook for Stabilization/solidification of Hazardous Waste, Date: 6/1/86, Pages (125), Epa/540/2-86-001

Reviews of In-place Treatment Tech-niques for Contaminated Surface Soils-vol. 1: Tech-nical Evaluation, Date: 9/19/84, Pages (165), Epa/540/2-84-003a

Technology Screening Guide for Treatment of Cercla Soils and Sludges, Date 9/1/88, Pages (130), Epa 540/2-88/004

RI/FS Ground-water Monitoring & Protection Criteria for Identifying Areas of Vulnerable Hydrogeology under Rcra: Statutory Interpretive Guidance, Date: 7/1/86, Pages (95o), OSWER #9472.00-2a

Final Rcra Comprehensive Ground-water Monitoring Evaluation (One) Guidance Document, Date 12/19/86, Pages (55), OSWER #9950.2

Ground-water Protection Strategy, Date: 8/1/84, Pages (65), Epa /440/6-84-002

Guidelines for Ground-water Classification under the Epa Ground- water Protection Strategy, Date: 12/1/86, Pages (600), Epa/440/6-84-002

Protocol for Ground-water Evaluations, Date: 9/1/86, Pages (200), OSWER #9080.0-1

Cercla Compliance with Other Environmental Statutes, Date: 10/2/85, Pages (19), OSWER 9234.0-2

Cercla Compliance with Other Laws Manual, Date: 8/8/88, Pages (245). OSWER #9234.1.01

Final Rcra Comprehensive Ground-water Monitoring Evaluation (One) Guidance Document (Secondary Reference), Date: 12/19/86, Pages (55), OSWER #9950.2

Rcra Ground-water Monitoring Technical Enforcement Guidance, Date: 9/1/86, Pages (8), OSWER #9950.1a

Rcra Ground-water Monitoring Tech-nical Enforcement Guidance Document,, Tech:

Atsdr Health Assessment on Npl Sites, Date: 6/16/86, Pages (14)

Chemical, Physical & Biological Properties of Compounds Present at Hazardous Waste Sites, Date: 9/27/85, Pages (320), OSWER #9850.3

Guidelines for Carcinogen Risk Assessment, Date: 9/24/86, Pages (13), OSWER #9285.4-02

Health Effects Assessment Document, Vol. 28: Acetone, Arsenic, Asbestos, Date 9/1/84, Pages (1750), Epa/540/1-86/001-058

Integrated Risk Information System (Iris) a Computer Based Health

Risk Information System Available Through E-mail Brochure on Access Is Included), Date: - Pages (0)

Public Health Risk Evaluation Database Two Diskettes Containing the Dbase Iii, 9/16/88, Pages (0)

Superfund Exposure Assessment Manual, Date: 4/1/88, Pages (160), OSWER #9285.5-1

Community Relations in Superfund: a Handbook, Date: 6/1/88, Pages (188), OSWER #9230.0-03b

Interim Guidance on Superfund Selection of Remedy Date: 12/24/86 Pages (10) OSWER #9850.0-19

Rcra/cercla Decisions More on Remedy Selection, Date: 6/24/85, Pages 93)

Thomson, K. O. T., Chaudhary, M. A., Dovantis, K., and R. R. Riesing, Groundwater Remediation Using Extraction, Treatment and Recharge System, Focus GWMR, Winter 1989, Pages 92-99.

Timmerman, C. L., Feasibility Testing of In-Situ Vitrification of Arnold Engineering Development Center Contaminated Soils, Report Prepared by Pacific Northwest Laboratory, Richland, Washington, ORNL/Sub/88-14384/1, March 1989..

Ultrox International, Brochure and Test Data.

US EPA, Cleaning Excavated Soil Using Extraction Agents: A State-of-the-Art Review, Risk

Reduction Engineering Laboratory, Office of Research and Development, Cincinnati, Ohio, EPA/600/2-89/034, June 1989a.

US EPA, Control and Treatment Technology for the Metal Finishing Industry, EPA/625/8-81-007@ 1981.

US EPA, Draft Interim Guidance of Estimating Inhalation Exposure During Showeling. Office of Research and Development, 1988a?

US EPA, Evaluation of Emerging Technologies for the Destruction of Hazardous Wastes, EPA/600/2-85/069, June 1985.

US EPA, Health Effects Assessment Summary Tables - First/Second Quarters FY1990, OERR9200-6-303 (90-1/2), 1990.

US EPA Meeting Hazardous Waste Requirements for Metal Finishers, EPA/625/4-87/ September 1987.

US EPA, Remedial Action at Waste Disposal Sites, EPA/625/6-85/006, October 1985.

US EPA, Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response, 1989.

US EPA, Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part B). Interim Final. Office of Emergency and Remedial Response, December 1991.

US EPA, Second International Conference on new Frontiers for Hazardous Waste Management, EPA/600/9-87/018F, August 1987.

US EPA,_ Superfund Exposure Assessment Manual. Office of Energy and Remedial Response. EPA/540/1-88/001, 1988b.

US EPA, Superfund Public Health Evaluation Manual, EPA/540/1-86/060, Office of Emergency and Remedial Response, 1986.

US EPA, Superfund Record of Decision, Byron Salvage Yard IL, Third Remedial Action, EPA/ROD/RO55-89/089, June 1989b.

US EPA, Superfund Innovative Technology Evaluation (SITE) Program, Description Pamphlet, EPA/540/8-89/002, EPA Research Symposium, April 10-12, 1989.

US EPA, Survey of Fugitive Dust for Coal Mines. EPA-908/1-78/003, 1978.

US EPA (1990). "Ground Penetrating Radar Survey, Dec. 12, 1989, Parson's Casket, Belvidere, Illinois," Superfund Technical Support Unit, Chicago, Illinois.

Weber, W. T., and B. M. Van Vliet, Synthetic Adsorbents and Activated Carbons for Water Treatment: Overview and Experimental Comparisons, AWWA Joumal, Volume 73, Pages 420-425, August 1981.

Weber, W. J., Physicochen-dcal Processes for Water Quality Control, John Wiley & Sons, Pages 503-531@ 1972.

Weber, W. F., and W. Bowman, Membranes Replacing Other Separation Technologies, Chemical Engineering Progress, Volume 82, No. 1 1, Pages 23-28, 1986.

Weston, Task Order 7, Interim Tech ical Report Heavy Metal Contaminated Soil Treatment: Conceptual Development, February.1?87.

Weston, In-Situ Volatilization Remedial System Cost Analysis, Technical Report prepared for U.S. Army Toxic and Hazardous Materials Agency, Maryland, August 1987.

Wilson, J. T., and C. H. Ward, Opportunities for Bioreclamation of Aquifers Contaminated with Petroleum Hydrocarbons, Developments in Industrial Microbiology, 1987, Supplement No. 1, Pages 109-116.

Soil Screening Guidance: User Guide, April 1996.

Role of the Baseline Risk Assessment, OSWER Directive 9355.0-30.

Responsiveness Summary for the Parson's Casket Hardware Site Public Hearing Illinois EPA File #248-96
September 1996

Responsiveness Summary for the Parson's Casket Hardware Site Public Hearing
Illinois EPA File #248-96

INDEX

AGENCY DECISION

On September 26, 1996, the Illinois Environmental Protection Agency (Illinois EPA or Agency) and the United States Environmental Protection Agency (USEPA) decided to accept the remedial actions as outlined in the proposed plan for the Parson's Casket Hardware Company Site. The effective date of this decision is September 30, 1996.

Parson's Casket Hardware Company

The Parson's Casket Hardware Company manufactured and plated metal fittings for caskets from 1898 until it filed for bankruptcy in August, 1982. From the mid-1920s until 1982, the company operated at 424 Fairview Street in Belvidere, Illinois. Electroplating metal parts typically produced wastes such as heavy metal contaminated sludges, cyanide plating and cleaning solutions, and metal-cleaning chlorinated solvents. The property is currently being used for similar industrial processes by a different company but with strict waste management practices being utilized to prevent any contribution to the sites contamination. The site boundaries are shown on the site map (page 4) along with the location of the waste lagoon where the contamination levels are the most severe. The current owners and operators at the site have offices, processes, storage, and distribution areas all located at the site but are not in any way affiliated with the Parson's Casket Hardware Company.

ILLINOIS EPA PUBLIC HEARING AND HEARING RECORD

Upon review of the Proposed Plan, the Illinois EPA issued a Public Notice to announce two Public Availability Sessions on June 25, 1996 (2:30-4:30pm and 6:30-8:30pm). Because of the public interest, the Illinois EPA determined that a public hearing should be held. The hearing notification was published in the Rockford Register Star and in the Belvidere Daily Republican on the following approximate dates: July 5, 13 and 23, 1996.

The public comment period began on July 17, 1996. The public hearing started at 6:30 pm on Wednesday, August 7, 1996, with twenty-seven people attending the proceedings held at the Ida Public Library (320 North State Street, Belvidere) and continued until 8:00 pm. The public comment period and the hearing record were closed on August 15, 1996.

This responsiveness summary addresses comments received at the public hearing and written comments received by the Agency between July 17, 1996, and August 15, 1996. The main issue addressed at the public hearing was that of the Proposed Plan. The proposed plan is the document that suggests a course of action that the Agencies may take to remediate the site. The public comment period allows the Agencies to receive any questions or comments related to the proposed plan before a final decision is made. The proposed plan may also undergo revisions due to the comments that are submitted if the Agencies believe that the proposed plan should be changed in order to address issues raised by the public. A responsiveness summary is prepared to address any relevant questions or comments, whether they result in changes being made to the proposed plan or not.

Citizens are encouraged to review the proposed plan and other documents including fact sheets and this responsiveness summary, which are located in the following public repository under the name "Parson's Casket":

Ida Public Library
320 North State Street
Belvidere, IL 61008

Telephone: 815/544-3838
Hours: Monday through Friday: 9:30 am - 8 pm
Saturday: 9:30 am - 5 pm

Map of Site:

RESPONSIVENESS SUMMARY

Index of Issues

Issues Relevant to the Proposed Plan: Page

Section

Section 1: Impacts to the Ground or Surface Water

Question 1-1: Have the contaminants reached the Kishwaukee River?

Answer: Yes. The monitoring wells along the banks of the river have shown contaminants that are associated with this site. What is not known yet, and won't be known until further testing and sampling is done, is whether the contaminated groundwater is simply flowing under and past the river or whether it is mixing with the river. The geology of the area is not fully characterized and until more investigation is accomplished, all that is known is that the contaminants have migrated a distance at least as far away as the river in the direction of the river.

Question 1-2: Have the contaminants impacted the water in the city wells?

Answer: The City of Belvidere has detected levels of contaminants at some of its wells during some of the regular sampling events. Although the contaminants are similar to those present at the Parson's site, whether the Parson's source is partly or wholly responsible for the contamination has not been determined. The City has addressed this by instituting procedures that allow for the treatment of the contaminants. The City water that is distributed to the public after treatment complies with all the state and federal regulations necessary to assure the water is suitable for drinking and other uses.

Question 1-3: Has the migration of contaminants compromised the safety of the wells that supply the city of Belvidere with water?

Answer: Although the City wells do show evidence of both natural and manmade contaminants in the raw water supply, the City's water treatment processes have removed the undesirable components to below the Federal Drinking water standards. This means that no water that is, or has been, distributed by the city is unsafe for drinking or any other use. Since some manmade contaminants may not be associated with this site directly, it is not clear whether this site is the major or only source of the contaminants but an extensive investigation that is necessary to address that question is now underway.

Section 2: Selection of the Remedial Action

Question 2-1: What is the likely time table for the removal action if the recommended actions are chosen?

Answer: An exact time table is not fully developed currently but it will be provided through the public repository when available. The Agencies would expect the approximate time table to be as follows:

9/26/96	Record of Decision signed by Agencies
Winter 96-97	Work plan written, submitted, reviewed, and approved
Spring 97	Final preparation of site for removal action

Summer 97   Removal of contaminated soil from site

Groundwater investigations are already underway but due to the complexity of the groundwater issues, both on and off site, the completion of such studies will take a considerable amount of time. The Agencies conducting the studies will endeavor to provide the data and conclusions as it becomes available.

Question 2-2: What is the justification for selecting the removal action that is recommended?

Answer: All the criteria, calculations, discussion, and determination of the selected removal actions in comparison to the other possible actions are found in detail in the Feasibility Study with a summarized version appearing in the proposed plan. Please refer to these documents for a full explanation of the selected action. A given action, however, only emerges as an Agency recommendation when it is shown that it best meets the requirements of a satisfactory remedial action.

Comment 2-3: It is premature to select a remedy with the information that is contained in the Soil Operating Unit FS.

Response: The Agency does not agree. We believe enough information exists in the Operable Unit Feasibility Study (FS) and the Remedial Investigation (RI) to support the remedies selected for this site. Investigations have been ongoing since 1982 and are still underway (i.e., groundwater investigations). The data gathered to this point is adequate to support the recommendations found in the Proposed Plan. While the data that will be gathered from the ongoing investigations are critical to answering significant groundwater issues, the Agencies feel that the remedial actions to be taken now are appropriate, based on current findings and will be beneficial toward any remedial actions selected in the future.

Comment 2-4: The FS is for soil only, and groundwater is being dealt with as a separate operable unit FS. The FS only updated the baseline risk assessment (BRA) for the shallow soils and that BRA (presented as Attachment H to the FS) is still in draft form. The updated soil BRA presented in the FS concludes that risk for the shallow soils is the same as for background, and therefore "limited to no action" is proposed. This conclusion is understood. The BRA for deep soils, however, has not been updated since 1992, nor has a baseline risk assessment been completed which evaluates the overall risk associated with groundwater.

Response: Several factors influenced the updating of the shallow soils operable unit baseline risk assessment (BRA). In June of 1992, the USEPA revised the cancer slope factor (CSF) for benzo(a)pyrene. The CSF is critical to the quantification of cancer risk in the BRA. The revision for B(a)P recognized an error in USEPA's calculation of the CSF and had the effect of reducing the estimation of risk due to contact with quantities of B(a)P. In March 1993, USEPA released its toxicity equivalency factors guidance for use when evaluating cancer risks due to exposures to quantities of carcinogenic polynuclear aromatic hydrocarbons (PAHs). This guidance provided a more accurate method to evaluate the carcinogenic PAH chemicals and had the effect of further reducing the estimated risks from the site.

These two revisions were substantial in magnitude and both operated in the same direction; toward reducing the estimation of cancer risks for PAHs. Because carcinogenic PAHs were the chemicals that were driving the surface soil risks at this site, it was prudent to recalculate risks based upon the most current evaluation methods. These factors are irrelevant to carcinogenic risks calculated for deep soil. B(a)P and other carcinogenic PAHs do not drive the risks for deep soil. The toxicity values and methods for evaluating the chemicals detected in deep soil were unchanged. This would provide the appropriate level of protection for human health and the environment, and therefore, no revisions were made for the deep soil operable unit.

As for the "draft" in the revised risk assessment for shallow soils in Attachment H, it would not have been cost effective to revise the entire document based on a word change in the document. Therefore, it was concluded that the "draft" could remain in the title since the revised risk assessment was becoming an attachment to what is now the final Feasibility Study.

Comment 2-5: The BRA, originally issued with the Remedial Investigation (RI) in 1992, has a number of errors related to its calculations on the potential for deep soils to affect groundwater at the Site. Deep soil is being proposed for removal in the FS due to the groundwater exposure pathway. Prior to proposing any remedy for deep soil, it is critical that these calculations be corrected. No remedy should be selected for deep soils until the groundwater investigation has been completed and the risk assessment has been verified for its accuracy related to groundwater exposure.

Response: The Agencies do not agree that there are errors in the calculations. The RI was finalized in January 1993 with calculations that were completed using the site specific data available at that time. The BRA was completed utilizing guidance issued by USEPA and reviewed to the fullest extent possible for errors. The Agencies believe the completion was approved with all risk calculations compliant with the guidance available for the project at the time. Information regarding default values was retrieved through literature searches at the time of the 1992 BRA, when site specific data could not fulfill definitive data requirements of the risk guidance in calculating risk for the site. This is commonly done for Superfund projects and is consistent with other projects conducted by the State of Illinois.

We do know that the deep soils are adversely impacting local groundwater. The Agencies believe that overall protectiveness of human health and the environment is best achieved by utilizing the risk assumptions calculated in the 1992 BRA for the deep soil operable unit. Therefore, the Agencies agree that the risk numbers are appropriate for the deep soils and that removal would best serve requirements under the NCP, as well as the local residents impacted by the site or any future use of the property.

Comment 2-6: The Proposed Plan does not consider the potential major risks presented by the implementation of the remedial alternative chosen which may far outweight the, at most, marginal risk posed by the deep soils when errors in the BRA calculations are corrected.

Response: Again, the Agencies do not agree that errors were made in the calculations, but to address the rest of the comment, the Agencies understand the risk inherent to the remedial alternative selected and will take all precautions to ensure that releases will not occur and that workers and the public are adequately protected during the removal. The Agencies believe that the potential risk in the removal action does not outweight the calculated risk posed by leaving deep soils in place.

Comment 2-7: If after reevaluation of the risk assessment and inclusion of risk presented by the remedies it is determined that a remedy for deep soil other than "Limited No Action" is still needed, soil vapor extraction (SVE) is the most cost effective remedy for elimination of the potential for migration of VOCs to Site groundwater from deep soils and will be protective because non-VOCs in deep soils were found to present negligible risk of migration to groundwater.

Response: The risk assessment does not need to be reevaluated. The Agencies believe the BRA from 1992 and the revisions for shallow soils from 1995 are accurately representative for risk at the site.

Although it is true that the Soil Vapor Extraction (SVE) alternative is less costly than the remedial alternative selected for deep soils, based on site specific information, SVE will probably fail to meet expectations for design or operational performance. This was concluded based on various factors. The range of effectiveness based on other projects is between 70-90% efficiency for removal of VOCs. This means that some residual VOCs would remain at the site and SVE is not effective in remediating semivolatiles or metals - both present at the site.

The SVE alternative is selected as a remedial alternative when site specific conditions are ideal for extraction of VOC vapors. Unfortunately this Site has less than ideal subsurface geological conditions. The soil is heterogeneous with various clay lenses which would adversely affect SVE performance. There is also an identified contaminant (called an Non Aqueous Phase Liquid or NAPL) at the site which has not been completely characterized for volume. A sludge seam was also discovered during the 1984-85 remediation of the old lagoon. Neither of these factors could be calculated into the design of an SVE system, since their influences on and by the SVE would be unpredictable. There is also a PCE plume on the southwest portion of the site from an unknown source area. This PCE plume would probably adversely influence the performance of the SVE system since nothing is known of PCE's origin. There are the further unknown influences of the suspected dry wells and since very little information is available on these dry wells, they may also adversely affect the performance of the SVE system. Soil moisture content and vapor retardation factors have also been identified as less favorable for SVE. Based on these factors it was determined that SVE could not be implemented with a high degree of certainty or success or with adequate assurances that the system could perform over a reasonable amount of time.

Comment 2-8: If there is a current concern regarding the possible need to perform SVE remediation beneath the building, it would be appropriate to combine this effort with the use of SVE in adjacent areas at the site.

Response: Based on information contained in the FS, it appears that additional source areas may not be located under existing building structures. However, if additional information did indicate that contamination was located under a structure the use of SVE for remediation would be considered. This does not change the factors that lead to SVE being dismissed for remediation of the deep soils. (Refer to SVE effectiveness for deep soils at this site discussed above in the response to comment 2-7.)

Comment 2-9: The risks and hazards associated with the leaching of contaminants from deep soils to groundwater are based on a too conservative value of foc (0.1%). USEPA Guidelines assume foc default values ranging from 0.2 to 0.6%. Recalculation of the risks using these foc default values yields values with the "acceptable" cancer risk range of 1.0E-06 to 1/0E-04 and hazard indices slightly above 1 (for foc 0.2%) and less than 1 at higher foc values. The use of 0.1% foc thus overestimates the risks and hazards associated with the leaching of contaminants from deep soil to groundwater.

Response: The value of 0.1% for foc used in calculating the excess carcinogenic risks and hazards associated with the leaching of contaminants from deep soils to groundwater was derived from a literature search in 1991. Remedial alternatives for deep soil were developed for the current FS in 1995 prior to the publication of the USEPA default foc values of 0.2%-0.6%.

Using the foc value of 0.1%, the risks and hazards associated with leaching of contaminants from deep soils to groundwater are in the same order of magnitude as those calculated using the 0.2% value (i.e., 10-5) for excess carcinogenic risk and >1 for health induces. Thus, use of 0.1% for foc is not overly conservative.

Remedial alternatives are developed where excess carcinogenic risks are greater than 1.0E-06 and/or health hazards (per target organ) are greater than 1. Commonly, it is the excess carcinogenic risk that determines the need to remediate. Although USEPA guidance suggests a target range of 1.0E-04 to 1.0E-06 as moderately acceptable, risks in this range do not de facto justify no action to be taken. Remediation may be undertaken when excess carcinogenic risks are in this moderately acceptable range according to site specific considerations and lead agency/community disposition. Moreover, although a 0.6% value of foc yields health hazard induces <1, the excess carcinogenic risks, ranging from 5.0E-06 to 1.7E-05, remain greater than the level considered as the "point of departure" (i.e., 1.0E-6) in remediating a site. Thus, risk values, based on calculations using any foc values ranging from 0.1% to 0.2%, would require the development of remedial alternatives for deep soils at Parson's. Given the similarity of risks and hazards associated with foc at 0.1% and 0.2% and that foc values up to 0.6% yield excess carcinogenic risk greater than 1.0E-6, the development of remedial alternatives for the deep soils remains valid and a revision of the BRA is not required.

Regarding groundwater, the TCE parts per billion (ppb) concentrations for the deep alluvial aquifer at the site indicate an estimate of UCL may be calculated at 200 ppb. In a residential groundwater ingestion scenario the cancer risk (ELCR) of 1.0E-04 occurs at a calculation of 160 ppb. Therefore, at 200 ppb the higher end of the Superfund risk range of 1.0E-04 to 1.0E-06 would be expected to be exceeded. This risk is unacceptable. The groundwater feasibility study does not have to be completed before selecting a remedy for soils, unless there is great doubt that the Parson's site is the source of TCE in groundwater. It has been determined that the TCE in groundwater beneath the site originated from the old lagoon area and possibly from the suspected dry wells and is continuing to leach into the groundwater.

Furthermore, even if current Soil Screening Level (SSL) guidance was taken into consideration, the deep soil data would indicate that SSLs for the protection of groundwater have been exceeded for the following chemicals: TCE, Benzo(a)anthracene, Chrysene, Methylene Chloride, N-Nitrosodiphenylamine, Pentachlorophenol, Arsenic (borderline), Barium, Cadmium (borderline), and Nickel. This is in reference to some organic and inorganic chemicals for which deep soil data was reported and for which SSLs are available. These conclusions are based upon approximations of the UCLs for these chemicals in deep soil. Therefore, the deep soil data appears to compliment the results of the groundwater monitoring data, i.e., exceedances of SSLs generally results in significant and unacceptable risk in groundwater. This would also support the decision not to select SVE based on the fact that inorganics have exceeded or are borderline of their respective SSLs and SVE is not effective in remediating inorganics.

Comment 2-10: The remedial action recommended by the Agencies requires the costly relocation of a water main.

Response: It is true that the water main, which bisects the property through the former lagoon area, is proposed to be relocated to the southern portion of the property. This decision was based on discussions with the City of Belvidere, who wish to continue using the water main adjacent to the Parson's property in order to supply service to the buildings at Parson's.

It is also believed that the water main may have acted as a preferential pathway for contaminants to travel beneath the ground surface much like a conduit. Since the present water main has deteriorated to the point of failure (i.e., leaking underground) and the City feared that contaminants from Parson's may compromise the City's drinking water supply if a negative flow situation arose, it was determined that the best course of action would be to relocate the main to an acceptable location with the installation of a new pipe to ensure integrity.

Glossary and Acronyms

Groundwater	Includes all forms of water beneath the ground's surface.
Illinois EPA	Illinois Environmental Protection Agency.
Public Hearing Record	Period of time before, including, and after the public hearing for the collection of written testimony and hearing transcript. The hearing record began April 21, 1995, and remained open until November 10, 1995.
Responsiveness Summary	A document prepared by the Illinois EPA in response to questions and issues raised during the public hearing record (this entire document).
Surface waters	Includes all forms of brooks, streams, rivers, ponds, drainage ditches, impoundments, or lakes of natural or manmade origin.
USEPA	United States Environmental Protection Agency.

For Additional Information

For information related to the Public Hearing Process, Hearing Record, Hearing Exhibits, or Hearing Transcript, please contact;

John Williams
Illinois EPA Hearing Officer
217/782-5544
TDD: 217/782-9143
Fax: 217/782-9807

Additional copies of this Responsiveness Summary

Mark Britton
Illinois EPA - Office of Community Relations
217/524-7342
Fax: 217/785-7725

Thanks to all the citizens that became involved in this process. On behalf of Director Mary Gade and the Agency staff, I would like to thank the large number of citizens who took time to get involved by participating in the public hearing, reviewing documents in the repositories, meeting with the Illinois EPA staff, and sending in written comments for the hearing record.

Signed: ______________________________
John D. Williams,
Agency Hearing Officer

Date: _________________________, 1996

Distribution List

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